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United States Department of the Interior

Criteria and Guidelines for Evaluating Projects and U.S. - Mexico Border Activities

prepared for the
Border Environment
Cooperation Commission (BECC)

December 15, 1994

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Fish and Wildlife Service
Bureau of Reclamation
National Park Service
National Biological Survey

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Section I

INTRODUCTION

This document was developed by Department of the Interior (DOI) bureaus to assist the Border Environment Cooperation Commission (BECC) in developing criteria and establishing guidelines for evaluating projects along the 2,000-mile United States-Mexico border.

The purpose of BECC is to help preserve, protect, and enhance the environment of the border region. Its focus is in the areas of water pollution, wastewater treatment, water supplies, municipal solid waste, and related matters. Its functions include coordinating environmental infrastructure projects, developing such projects, analyzing their financial feasibility and environmental aspects, evaluating their social and economic benefits, developing financial arrangements, and certifying applications for financing. BECC is charged with establishing procedures for public notice and for ensuring the documentation of its projects and general guidelines is available to the public.

These **Criteria and Guidelines for Evaluating Projects and United States-Mexico Border Activities (Criteria and Guidelines)** contemplate that a variety of proposed border environmental infrastructure projects from a wide range of providers will be submitted to the BECC for consideration and that evaluation criteria to be used by the providers will be required to determine which projects are environmentally sensitive and sustainable (implementable) and in which sequence they should be implemented. The role of border States will be taken into account throughout the process.

Department of the Interior bureaus have, accordingly, codified existing criteria and have prepared BECC-targeted material for this document. Initial sections address BECC-specific criteria; general, across-discipline planning and ranking concepts; general project and technical criteria; and bureaus' construction and project management procedures. Other sections of the document include the bureaus' mission statements, existing Border projects, potential services to BECC, and summaries of expertise. Concluding parts of this document deal with policy and regulatory references.

BACKGROUND

Mexico and the United States share a great wealth of natural resources and people along their 2,000-mile border. This thin political ribbon overlays an equally rich diversity of landscapes and cultures, contrasting some of North America's most pristine, untouched ecosystems with some of the fastest growing urban areas.

Today almost 10 million people call the border region home, a tenfold increase in the past 60 years, and a number that will double in only 20 years. The border has become a meeting place of peoples, traditions and futures, as well as a dynamic ecological merging of North America's fish, wildlife, and plant communities.

On the U.S. side of the border, the Rocky Mountains meet the Sierra Madres. Desert basins drop below, draining isolated "sky islands." Neotropical plant communities merge with desert scrub and montane woodlands. Cienegas and bolsons capture basin and spring water while riparian communities survive along rivers that drain to coastal estuaries. An amazing abundance and diversity of wildlife—migratory and resident species—can be found here. And all these features depend on a limited supply of water which is also needed by a growing human population.

The US-Mexico border region hosts over 490 species of flora and fauna listed as endangered or threatened, or proposed for listing. In addition, border ecosystems support more than 450 rare or peripheral species. More than 200 neotropical migratory species (birds, mammals, and insects such as

the Monarch butterfly) use these diverse habitats during their spring and fall migrations. Some breed in these ecosystems and many are considered rare or endangered.

Recent passage of the North American Free Trade Agreement (NAFTA) represents formal recognition of the US/Mexico region's importance to both countries and an acknowledgement of its unique natural resources. NAFTA-related development has affected and will continue to impact the border resources we share. Infrastructure and resource demands are already occurring and will continue to accumulate—international construction, the maquiladora industry, colonias, and the use of pesticides and other contaminants are all increasing.

BORDER ENVIRONMENT COOPERATION COMMISSION

The BECC was established under the November 28, 1993 "Agreement Between The Government of the United States of America and the Government of the United Mexican States Concerning the Establishment of a Border Environment Cooperation Commission and a North American Development Bank" (Agreement) with a broad charter to assist Federal, State, and local governments and private interests to develop environmental infrastructure within 100 km (62 miles) on either side of the border, and outside that region "upon finding that the project would remedy a transboundary environmental or health problem. . ." and with concurrence of the U.S. Environmental Protection Agency (EPA) and Mexican Secretariat of Social Development (SEDOSOL). The BECC will operate as a single international organization and will not represent either the United States or Mexican government individually, or take advocacy positions on the part of either government. It is anticipated that the BECC, as a binational organization, will be able to address issues and resolve problems within the framework of its own organization and will not ordinarily require diplomatic intercession.

BECC has been created largely to provide accountability to the public for projects that receive funding from the North American Development Bank (NADBank). However, theoretically, BECC may oversee and "certify" other financing projects beyond NADBank. For example, BECC could oversee World Bank loans for projects parallel to those of NADBank.

BECC's mandate is to work with affected States, communities, and nongovernment organizations (NGOs) in developing effective solutions to environmental problems in the border region. BECC's operation is meant to promote public participation, offering individuals from local communities and other groups the opportunity to comment on BECC's general guidelines and on applications for certification of projects.

To be eligible for BECC certification, projects must observe local environmental laws and other criteria. Those with significant transboundary effects must provide an environmental assessment. Subsequently, BECC's board, in consultation with affected States and localities, will determine whether such projects meet the necessary conditions to achieve a high level of environmental protection for the impacted area.

NORTH AMERICAN DEVELOPMENT BANK

The NADBank will act as the lead bank in the financial packaging of BECC-certified border projects. NADBank has been created to finance both environmental investments and NAFTA-related "community adjustments." Among its high-priority environmental projects are the provision of potable water, wastewater treatment, and municipal solid-waste disposal. Total costs for these resources and

services are estimated to range from $6.4 to $8 billion over the next decade, of which NADBank will provide $2 billion in the form of loans and guarantees. "Community adjustments" are investments directed to communities anywhere in the United States or Mexico that are adversely impacted by free trade. Ten percent of NADBank funding is slated to be spent on such social-adjustment programs, with areas most negatively affected by NAFTA (such as Chiapas) given priority.

NADBank, like BECC, will be able to finance only those projects meeting certain environmental criteria. NADBank capitalization has been set optimistically at $3 billion, with the United States and Mexico each pledging to contribute $225 million in capital, divided into equal installments over 4 years. Each country has also agreed to contribute $1.275 billion in "callable" capital. The $225 million in hard cash guarantees that both governments will underwrite any loans from NADBank to leverage a theoretical $8 billion. However, any loans made on the "callable" capital can be called due at any time—and must be paid back forthwith, even if the money is not there. NADBank funds are theoretically to be used to enhance other monies (appropriations, grants, bonds, fees, loans) in order to increase the actual value. For environmental-infrastructure projects, the expectation is that user fees will pay back the loans.

NORTH AMERICAN COMMISSION ON ENVIRONMENTAL COOPERATION

The North American Commission on Environmental Cooperation (CEC) is a trilateral ministerial panel whose mission is to improve environmental enforcement and compliance, and address specific issues outlined in North American Agreement on Environmental Cooperation. Those issues include development of pollution-prevention techniques and strategies, handling of transboundary and border-region environmental problems, protection of wildlife and flora, including habitat protection, and preparation for environmental emergencies.

The trilateral accord establishing CEC seeks to harmonize North American environmental standards. Among the first projects to be addressed are: the compilation of a database of environmental laws, regulations, norms, and technical standards of each nation; comparative studies of criteria and methods used by each nation in establishing environmental standards, and the environmental impact assessment process—including how future border projects will generate special circumstances due to the potential for transboundary environmental impacts, and how each nation offers public access to environmental data. CEC will consult with BECC, NADBank, the World Bank, other relevant organizations, affected parties, and the public to determine which issues fall within the scope of CEC.

DEPARTMENT OF THE INTERIOR

DOI manages 37 percent of the landscape on the United States side of the border. DOI through the U.S. Fish and Wildlife Service (Service) also has responsibility for endangered species conservation, ecosystem management, migratory birds, wetlands, contaminant biology and natural resources damage assessments. The Service works with Mexico under international agreements in international conservation of endangered species, migratory birds, wetlands, and ecosystems. The border ecosystems that Mexico and the United States share support several endangered species, peripheral species, neotropical migratory bird (and mammal and insect) species and endemic flora and fauna. Mexico and the United States are already working on international biosphere reserves or proposing them to acknowledge and conserve natural resources and ecosystem health within many of these unique ecosystems.

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The Bureau of Land Management (BLM) works to manage natural resources and sustainable use on public lands along the United States side of the border. These public lands along with the Service National Wildlife Refuge lands and National Park Service (NPS) lands represent a significant contribution in conservation of natural resources and ecosystems shared with Mexico along the border. The Bureau of Reclamation (Reclamation) is extensively involved in water management, use, design and construction in the border area. The Geological Survey (USGS), along with Reclamation, BLM, Service, and NPS, has invested considerable resources in the study, monitoring, and management of ground water in the border area. The Bureau of Indian Affairs (BIA) works in trust responsibilities to ensure that indigenous communities in the area have access to services, outreach programs, and community funding, including BECC services. All DOI bureaus dedicate considerable resources to the study and management of surface water quality and quantity, allocation, and rights in the border area (table 1).

BECC AND DOI

The BECC relationship with DOI could be defined and structured in a partnership role. The creation of the BECC provides an opportunity to work with an innovative partnership approach with DOI and would complement earlier gaps in such pre-NAFTA driven documents as the draft Border Environmental Plan, with its limited focus on the entire border environmental issues, including managing natural resources and sustainable use. These issues affect the diverse ecosystems and ecosystem health along the United States-Mexico border.

The forming of a working partnership between BECC and DOI would create a team of advisors that can work directly in addressing natural resource issues and solutions with the multitude of environment laws, regulations, and policies in the sponsoring host country that is reviewing proposed planning or projects. This working partnership would be a new, innovative approach to coordinating border environmental issues and solutions including natural resources, trust resources, and ecosystem conservation. The partnership could complement the BECC mission under NAFTA.

Table 2 presents a summary of DOI capabilities. A more detailed breakout of each bureau is presented in section III.

Table 1.—DOI Team
Scope and Function

Scope and characteristics of BECC/DOI team	BECC	DOI
Organizational structure	International organization: binational board, Advisory Council and technical staff with binational representation. Officers/staff have some privileges/immunities in the territory of each nation.	Establish a new, innovative team that combines expertise in areas vital to BECC planning and analysis, coordination and consultation mission in full scope of environmental issues, including natural resources, trust resources, and ecosystem conservation.
	Binationally integrated board and staff may facilitate cooperative decision-making and innovation. The board's required mix of geographical representation and knowledge/background also assures informed decision-making driven by a border perspective.	Create a binationally integrated team of advisors with cross bureau expertise to work with BECC Officers and staff in advising, coordinating, working on innovative team solutions that assure options for informed decision-making. Team works under existing binational and international agreements such as CITES, Migratory Bird Treaty, North American Wetland Management Plan, Aves de las Americas, Western Hemisphere, and the United Nation's Man and the Biosphere Program.
Resolving binational issues of transborder pollution		DOI team acts as an agent for BECC in analysis of contaminant issues, natural resources effects, water resource contaminant issues, and ecosystem health which influences human health and sustainable use.
Resolving transborder ecosystem issues	The binational nature of the BECC board and Advisory Council, combined with NAFTA's environmental provisions will promote the conservation of shared border ecosystems within the sphere of the environmental realm of resolution-making within the Commission.	The DOI team acts as an advisory agent for BECC in ecosystem analysis, including management and conservation issues that need focus during evaluation of proposed planning and project design or funding. Innovative mechanisms exist with NGOs and other private and public sources for funding ecosystem conservation planning and actions as part of border environmental projects
Process		DOI team functions through Partners for Natural Resources Conservation as mechanism for team funding. Team approach designed as innovative group that can seek outside funds and assist BECC in funding sources that support a truly integrated border environmental approach to projects that benefit people, natural resources, and ecosystem conservation.

Table 2.—SUMMARY OF DOI CAPABILITIES

PARAMETERS	BIA	FWS	USGS	BOR	BOM	NPS	BLM	NBS

Section II

PROJECT DEVELOPMENT

One of the main responsibilities in developing projects is to review infrastructure projects for environmental feasibility and soundness, to ensure that high levels of environmental protection are adhered to as such projects are designed, constructed, and operated. A necessary and important component of that responsibility is the application of environmental standards to such projects.

A general proposed implementation schedule for projects could be established in five phases:

Phase I - Conceptual Evaluation and Environmental Assessments
Phase II - Predesign Investigations and Environmental Compliance Procedures
Phase III - Final Design and Environmental Compliance Documents
Phase IV - Project Construction
Phase V - Operations and Monitoring

GENERAL PROJECT CRITERIA

Described in subsequent paragraphs are phases of approval through which proposed projects would pass before implementation. These phases range from measures that assess basic viability to those that gauge levels of project support.

The first screening phase of proposals would be to assess the viability of a project described in project concept. Once approval of this phase is complete and the project concept is considered viable, then more detailed and specific screening phases would be applied related to engineering, economics, environment, and social aspects. Planning and proceeding with the construction phase would be another specific screening phase to consider.

Initial screening criteria would center on the severity of the problem, location, financial feasibility, timeframe for accomplishment, sustainability, benefits, costs, relationship to master/regional plans, transboundary or comprehensive effects from a beneficiary and environmental standpoint, and evaluation of positive and negative impacts.

The proposals should demonstrate that there is local support at various levels, that initially there would be appropriate public participation incorporated, and that there would be continued public participation throughout the life of the project.

To consider requests for proposals and to demonstrate that some coordination effort has been made, regional areas could establish a master/regional water management plan for their particular region that would address water pollution, wastewater treatment, municipal solid waste, and related matters. All proposals would be submitted to BECC through these regions for coordination. BECC would then be able to evaluate these projects knowing the projects fall within the purview of the regional environmental infrastructure. For example, several regional areas could be established along the border from Texas/El Paso to Brownsville. This reach of the border might encompass five regional areas—El Paso/Juarez Area, Del Rio/Eagle Pass, Laredo/Nuevo Laredo, Falcon Dam area, to the Brownsville/Matamoros area.

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A format for the submittal of these proposals that would be available to anyone interested in submitting a proposal would be established. A request for proposal would describe the concept of the proposed project as well as the regional master plan. Applicants would not design a full-scale project before any funding was available because, in some cases, applicants may not have funding to prepare a full-scale project plan for submittal.

Two types of proposals would be established, one a low-cost proposal for an initial screening to assist proposers in focusing on objectives through feedback on the preproposals. It would not necessarily be required, but it would provide feedback without spending a lot of resources. The other, more formal type of proposal, might include the following basic general criteria to justify and prioritize projects:

- Name of project
- Project purpose
- Project concept
- Problems and opportunities/needs
- Short- and long-term benefits
- Physical location
- Resources to meet needs
- Supporters and/or opponents
- Proposed solutions
- Features (structural, nonstructural, or both)
- Significant issues or special problems critical to decision to study
- Partnership/sponsors
- Process/rationale for selecting the proposed project
- Extent, type, and nature of the anticipated positive and negative impacts to the United States-Mexico
- Effects on environmental ecosystem (NEPA compliance and other environmental constraints/laws)
- Correlation to existing facilities and other proposed or existing projects
- Relationship to master/regional plans for the affected area
- Estimated cost of project (includes annual cost associated with operation, maintenance, and replacement, and future cost for expansion)
- Extent alternatives have been evaluated
- Expected project life or usefulness of the project
- Extent of initial and ongoing public participation
- Evidence of commitment/support from project sponsors and beneficiaries (form of resolutions, letters of support, intent, agreements)
- Funding sources (United States Federal funds, no Federal funds, cost-share, other, upfront financing, amounts)
- Financial analysis
- Timeframe for implementation from planning through completion of construction, project on-line date
- Further planning necessary (state reason, and describe the nature and participants)
- Risks and uncertainties (includes data used, sensitivity analyses)
- Brief summary statement of why the BECC should consider the proposal

DECISION PROCESS—GENERAL

In the decisionmaking process, the benefits and impacts on the entire ecosystem and its management must be evaluated. Ecosystem management is described as a goal-driven approach to restoring and sustaining healthy ecosystems and their functions and values using the best science available. It entails working collaboratively with border regions, Federal, State, tribal, and local governments, community and indigenous groups, private landowners, and other interested parties to develop a vision of desired future ecosystem conditions. This vision integrates ecological, economic, and social factors affecting a management unit defined by ecological, not political, boundaries.

The decisionmaking process would encompass several milestones where decisions to initiate, implement, and complete a project would be necessary. The approval of the request for proposal would be the first milestone. In reality, the request for proposal only includes the basic concept of a project. Approval of the concept would then initiate the preparation of additional documentation by an applicant describing specific details of the proposed project.

Although all the phases of the project would be forecasted for the detailed and specific phase, decisions for a go/no go process would more than likely involve several milestones for decisions. These milestones are described below, with appropriate documentation suggested under each.

The decision process is a fluid, flexible process that leads to agreements, partnerships, actions, policy, or facilities to meet existing and future needs. At times, the decisionmaking process will lead to a conclusion that the best course of action is inaction.

The decisionmaking process is not a linear, orderly process. New players (interest groups, team members, etc.) enter the process at various points, while new data lead to different evaluations. Rather, the process can be seen as a spiral. While it appears that you are applying the same step, ever-increasing data and assessments, and growing levels of public awareness and interaction with the process mean that you are taking a new step at a higher level, thus closing in on the balanced decision.

BASIC STEPS IN THE DECISION PROCESS

Scoping

Examine the context, resources, and players involved.

The first step in the process examines the context of the study, proposes the focus of the problems and needs to be addressed, and lays the groundwork for the analysis and public participation. Thus, scoping both lays out the playing field and organizes the study effort.

Processes	Key products/results
Research history of issues	Understanding of study context, why problem exists, positive results and shortcomings of previous attempts to resolve
Identify key parties	Initial list of parties; updated regularly
Develop legal/institutional framework	Accepted description of legal authorities, mandates, criteria, constraints which guide the study ("Accepted" = agreed upon by key parties)
Initial study plan	Initial "study model"—initial study goals, participants, roles, process, schedule for initial activities

Problems and Needs

Determine the problems that are within the scope of your authority and needs (goals) that can be served.

The rest of the decisionmaking process will focus on meeting the needs that you define and decide to address in this step.

Processes	Key products/results
Develop data collection plan	Initial plan for data/analyses needed to support resource models, formulation of alternatives
Find out the players	Meet with study partners to uncover expectations Meet with affected publics Meet with special interest groups to discover potential controversies
Examine the knowledge base	Collect and analyze existing information related to the problem or potential action
Assess problems and needs	Initial "social setting model" -Understanding the problems, associated publics, and their interests and goals

Develop Alternatives

Develop workable alternatives to meet the identified needs.

Processes	Key products/results
Verify and quantify needs	Review results of "problems and needs" step
Verify objectives	Are you heading toward the correct goals
Assess available resources	Initial "resources model" —resource relationships, constraints, likely impact variables
Translate needs into objectives	Accepted objectives for alternatives formulation
Formulate elements of alternatives	Set of elements providing multiple ways to address each objective
Screen elements	Set of feasible elements
Formulate alternatives from surviving elements	Initial set of alternatives

Evaluate Alternatives

Develop selection criteria and determine which alternatives or combinations of alternatives best meet the criteria.

Processes	Key products/results
Develop evaluation factors	Accepted list of variables on which elements and alternatives will be assessed
Establish acceptable boundaries for most critical evaluation factors	Accepted screening criteria for evaluation of elements
Evaluate and compare alternatives	Performance of each alternative on evaluation factors and from perspective of each key party
Re-formulation of alternatives	New set of alternatives, including new concepts, compromise plans, and mitigation packages
Evaluation, negotiation	Identification of most implementable alternative(s)

Select and Implement an Alternative

Decision makers select the alternative plan for implementation. Implementation proceeds to completion and operation of the plan.

Processes	Key products/results
Select plan for implementation	Record of Decision
Begin implementation planning	contracts, bids
Implement	Complete operational changes or physical features of the plan
Physical follow-up	Operation, maintenance
Institutional follow-up	People are ensuring that the solution continues to address the problem

DEVELOPMENT PROCESS

A general development process (e.g., basin planning, watershed, environmental) and methodology to manage the environmental infrastructure is important to be established along the border areas under its jurisdiction. In this process, the entire ecosystem, an interconnected community of living things, including humans, and the physical environment with which they interact, should be considered. The system also provides goods and services that are the cornerstones of sustainable economies and enhance the quality of lives.

The proposed projects in relationship to master/regional plans and transboundary areas for United States-Mexico should be prioritized to assure that the most feasible and economically and environmentally sound projects are approved. Again, depending on the size and benefits, BECC would have standard criteria (see Exclusion and Ranking below), and different categories for prioritizing projects. Some projects would undoubtedly benefit only small communities and may not be considered or evaluated as part of the overall master/regional plan, but would be considered individually and as part of the large-scale projects.

Different evaluation procedures should be developed depending on the physical location of the project, anticipated project impacts, and funding considerations. Different rules/procedures will apply under each condition. Each procedure would depend on:

1. If the project is only on the U.S. side and U.S. Federal funds are to be used (e.g., full NEPA, etc.).

2. If the project is only on U.S. side but no U.S. Federal funds are involved (e.g., no Federal action, no NEPA, but permitting could be required).

3. If the project is only in Mexico (Mexico standards only).

4. If the project has transboundary impact—U.S. and/or Mexico side (U.S. and/or Mexico compliance standards or compromise).

DOCUMENTATION AND MILESTONES

The following list of documents are examples that DOI has used in the development process to not only evaluate projects for their use, but to assist them in presenting the proposed projects to the public, constituents, clients, and Congress for approval. Two processes are presented, one that would involve a more streamlined process for smaller projects, and the other, large and complex projects. Certain general criteria are standard for most projects; however, many of the proposed projects would be evaluated on a case-by-case basis.

STREAMLINED PROCESS

Request for Proposal

An average of 1-5 pages in length and used to justify and prioritize and program projects. Briefly describes concept of the proposed study with a self-explanatory outline of items to be considered for inclusion in the study. Outline will include purpose of study, type of study, location of study area, problems and opportunities/needs, timeframe, resources to meet needs, supporters and/or opponents, possible solutions, structural features (possible features, location, physical dimensions, capacities, and outputs, capital and OM&R costs, construction period) or non-structural and minor construction alternatives (features or methods, infrastructure improvements, distribution system improvements, system reoperation, institutional constraint changes, demand modification techniques, conversion of water use, other, capital and OM&R costs, implementation process, or combined structural/nonstructural features, as above).

It will identify significant issues or special problems critical to decision to study such as water rights/policy institutional changes, river basin compacts/changes/legality/time required, special consideration of Native Americans, customized procedures, unusual technical studies, especially expensive or lengthy studies, unique data requirements, political issues, significant environmental issues (threatened for endangered species and/or habitat, wetlands), cost-share and study cost schedule, cost share partners, role (cash, in-kind services), amount of contribution (if known), additional reasons for initiating study (political support), Federal role (if applicable), action and time necessary to reach goals.

PFWD WP (Work Plan)

Describes activities and related resources (personnel, funds, and time) to complete plan formulation process, prepare PFWD and select preferred plan, establish team and its activities, PFWD WP outline, draft PFWD WP activities, processing.

COMPREHENSIVE PROCESS

Plan of Evaluation (POE)

Detailed guide that sets the course for carrying out the entire planning process. Support document for project evaluation and for programming funds. Identifies activities, personnel requirements, and basic criteria for management of the evaluation. Includes objectives, criteria, and assumptions of the evaluation and outlines anticipated reports and supporting documents required. Public involvement plan is described and evaluation organization, schedule, and funding arrangements are presented. Existing data are summarized, and sources and level of new data are identified. A POE is a dynamic document and subject to revision as the project evaluation progresses. When completed, this document is used for funding purposes.

Preliminary Findings Report

Presents results of initial investigations and documents needed to continue or conclude the evaluation. Summarizes the process used to develop the alternatives considered, and identifies any data gaps, risks, or uncertainties associated with information collected to that time. States whether plans are viable and should be pursued. This document is used to review, approve, and prioritize projects.

Plan Formulation Working Document (PFWD)

Purpose of document is to obtain agreement among all participants on a recommended plan. Documents status of planning process signals the end of the plan formulation and selection process unless changes in conditions or relevant data dictate otherwise. Can be used to conclude the proposed project if unresolvable engineering, economic, or environmental issues arise and no viable alternative is identified.

This document will become the basis for completing the integrated planning report/draft environmental statement. Document will be finalized as the plan formulation appendix to the integrated report. Includes description of the physical, social, and environmental setting of the unit area; problems and opportunities toward which the evaluation is directed; and the resources available to satisfy those problems and opportunities. Discusses plan formulation process, alternatives considered, selected plan, and all criteria used to evaluate the plan including an analysis of the viable plans.

Used as a working document and not necessarily published in a polished form, this document contains sufficient detail to enable the technical reader to clearly understand the development of alternative plans and the logic used in selecting the recommended plan. Comments received will not be used to revise the PFWD, but will be used to finalize the preconstruction work plan and to convert the PFWD to a plan formulation appendix for the planning report/environmental compliance document.

The PFWD employs the following tests of viability:

1. Acceptability: A measure of the extent to which Federal, State, and local entities and the public will support a proposed plan that is workable and compatible with existing laws, regulations, and public policies.

2. Completeness: The extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects.

3. Effectiveness: The extent to which a plan alleviates the specified problems and/or takes advantage of identified opportunities.

4. Efficiency: Amount of output per unit of input. To be cost effective, a plan should optimize the amount of output, or damage reduction, given a fixed unit of input. (Note: The plan with the highest output per unit of input—most efficient—may not make the most of an opportunity to solve a problem.)

These tests and others are detailed in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (Reclamation, 1983) (*P&G's*).

Preconstruction Work Plan

Outlines the procedures to be followed during the preconstruction stage of the evaluation, and will be finalized prior to initiation of that stage and after completion of the PFWD and the proposed planning report/advance draft environmental compliance document. Generally consists of a revision of the information presented in a POE to reflect its more specific purpose and to integrate the latest data. Document presents description of the recommended plan and its structural features as presented in the PFWD. Sets forth the procedures necessary for the collection of preconstruction design data and other preconstruction activities. Identifies operating agreements needed to accomplish the evaluation. Schedules activities and presents personnel and funding requirements. If approved, preconstruction stage will commence.

Planning Report/Environmental Compliance Document

Any integrated planning report/environmental compliance document will be prepared as the planning stage is completed. Document will be supported by separately bound appendices detailing results of the evaluation in specific tasks. Appendices include those detailing plan formulation; designs and estimates; financial analysis; fish and wildlife; recreation; cultural resources; public involvement; other aspects related to water, wastewater, minimized solid waste, environmental infrastructure, pollution; and reports of cooperating agencies.

Document will describe area and problems and opportunities, and will assess the resources available for alleviation of these problems and meeting the opportunities. Summarizes planning process and presents results to date. Viable plans, including the recommended plan, will be presented in sufficient detail for evaluation, including social, economic, and environmental analysis. Assessment of environmental impacts that would result from implementation of any of the plans will be included as well as all other requirements for NEPA compliance.

The document can assist all participants in deciding whether or not to continue the evaluation. If project continues, document will serve as basis for construction certification. Document is reviewed and processed as prescribed by applicable Federal regulations and guidelines.

Preconstruction Report

Documents completed preconstruction designs and estimates, repayment requirements, environmental studies needed, and any other activities necessary prior to the start of construction. If additional NEPA compliance is needed, report will be prepared as an integrated proposed preconstruction report/supplemental environmental compliance document and will be released for further review; otherwise is an in-house document. Report used to justify funding of construction and serves as the basic control for the proper and orderly development of the project. Contains information prerequisite to signing contracts, acquiring land, initiating specification designs, and scheduling and programming construction. If construction is approved, report will be completed and processed as the preconstruction report/supplemental environmental statement. If construction certification does not occur, it is completed as a report to conclude the project evaluation.

EXCLUSION AND RANKING

Screening projects or alternative plans involves identifying appropriate criteria that will be used to 1) effectively eliminate projects(alternatives) from further consideration and 2) uniformly rate and rank projects(alternatives) for prioritization and ultimate selection of a preferred project(alternative). The screening process often requires baseline data collection on the biological, physical, economic, and social resources in the general project area in sufficient detail to facilitate informed decisions.

EXCLUSION SCREENING CRITERIA

Exclusion criteria are "fatal flaws" that represent negative effects that cannot be offset by any degree of benefits provided by other factors. They can include such determinants as:

- Not meeting purpose, needs, and objectives of project authorization
- Regulatory constraints

- Engineering constraints
- High probability of jeopardizing endangered species
- Other

If application of any of the exclusion criteria is reasonably doubtful, the project/alternative should be carried over to the evaluation screening process.

EVALUATION SCREENING CRITERIA

This is a process that ultimately rates and ranks projects using several factors. These factors relate to the economic, environmental, and social viability and acceptability of the project/alternative. It may be necessary to weight certain factors in relation to their real or perceived importance. Because the public may have substantive concerns about the screening, it is necessary to incorporate these concerns in the screening process through the Public Involvement and Scoping processes.

Evaluation factors can include the following:

- Risk and uncertainty
- Public acceptability
- Legal-political constraints
- Technical constraints
- National and Regional Economic Development Benefits
- Energy requirements
- Ability to pay compared to project cost
- Adverse and beneficial impacts to wetlands, aquatic and terrestrial ecosystems, and endangered species
- Population growth inducement
- Impacts to cultural resources
- Level of environmental compliance and analysis required

Table 3 and figure 1 are examples of rating checklists and displays used in project screening.

COSTS AND COMPLEXITY OF PROJECT SCREENING AND ENVIRONMENTAL COMPLIANCE

The complexities of project screening and environmental compliance depend largely on size of the project, the level of environmental impacts, and the issues that evolve. These factors greatly influence the time and costs required for public involvement, interagency coordination, data collecting, and impact analysis. For Environmental Compliance, as a general rule, CE's are required for projects of low complexity with insignificant impacts, EA's for projects of moderate complexity with impacts that can be mitigated to a level of insignificance, and EIS's for projects of high complexity with significant impacts. The steps involved in environmental compliance are compared in table 4.

Since the time and costs of environmental compliance often depend on the issues that develop during the public involvement process, the complexity and costs of environmental compliance and subsequent environmental commitment program may vary substantially. There is always the possibility of unforeseen circumstances increasing costs during a project (i.e, the listing of as threatened or endangered a candidate plant species in the project area).

Table 3.—Example of evaluation rating display for project screening

IMPACT	Weight	ALT 1	ALT 2	ALT 3	ALT 4
LEGAL/POLITICAL Water Rights	1X	2	1	3	3
ECONOMIC Construction and O&M	2X	0	2	0	1
SOCIAL Growth	1X	2	3	2	2
ENVIRONMENTAL Wetlands	2X	2	1	1	1
TECHNICAL Engineering	1X	3	3	3	3
Unweighted Score		9	10	9	10
Weighted Score		11	13	10	12

Impacts are rated and scored for comparison purpose as follows:

No impact	3
Minor impact	2
Major impact	1
Unresolvable problem	0

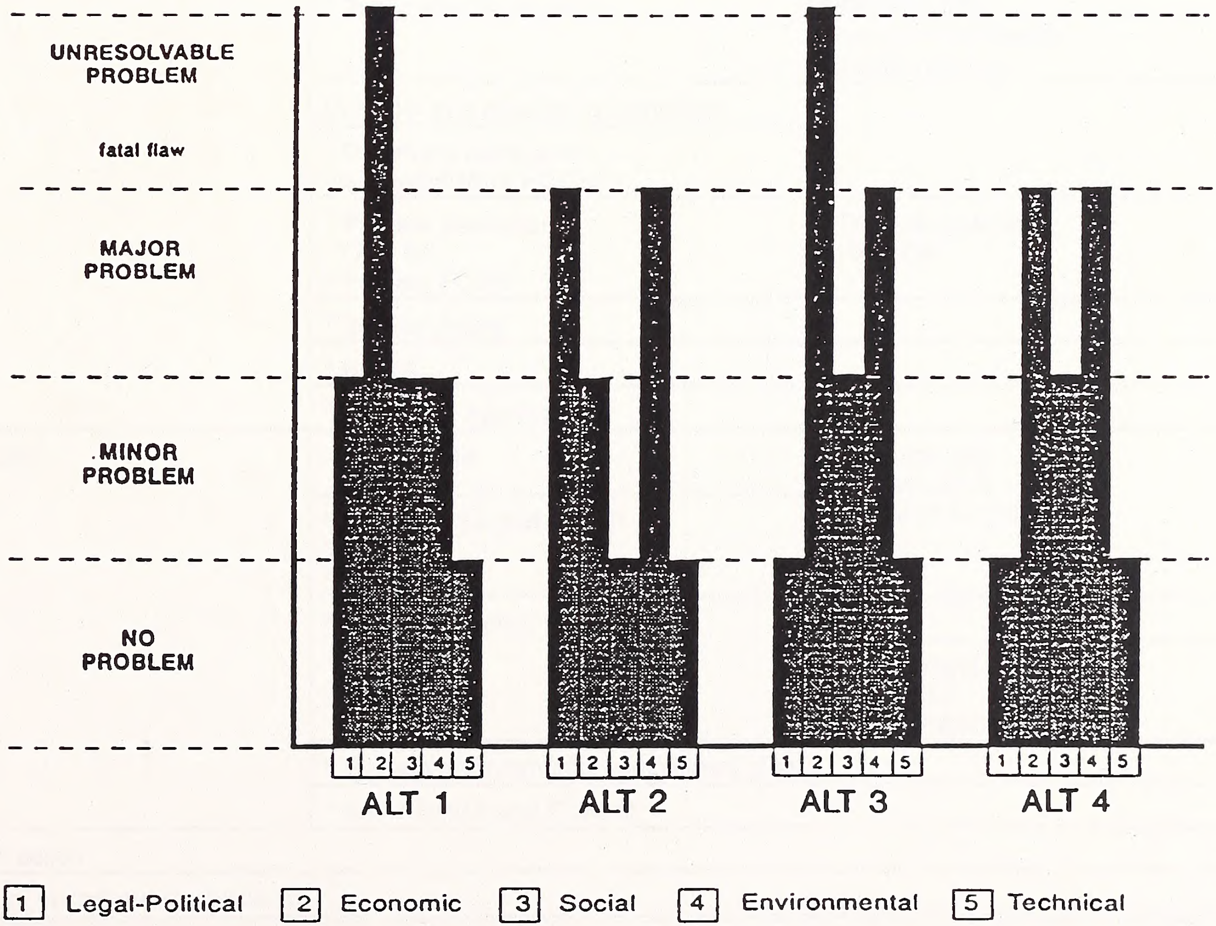

Figure 1.—Example of evaluation rating display for project screening.

Table 4.—A comparison elements of the NEPA process for CE, EA, and EIS

NEPA COMPLIANCE		
° Identify issues, proposed action, and alternatives ° Determine appropriate NEPA compliance		
CATEGORICAL EXCLUSION (1-3 months)	**ENVIRONMENTAL ASSESSMENT and FINDING OF NO SIGNIFICANT IMPACT** (9-12 months)	**ENVIRONMENTAL IMPACT STATEMENT and RECORD OF DECISION** (18-24 months)
° Site evaluation ° Agency consultation ° Determine mitigation	° Site evaluation ° Public involvement ° Agency consultation ° Impact analysis ° Determine mitigation	° Site evaluation ° Notice of intent ° Public scoping ° Agency consultation ° Impact analysis ° Determine mitigation
° CEC checklist ° Environmental evaluation (option)	° Preliminary draft EA	° Preliminary draft EIS
	° Internal review	
	° Revise	
	° Document approval	
	° Printing ° Distribution	
	° Public review ° 30 days (minimum) ° Public meeting (option)	° Public Review ° 60 days (minimum) ° File with EPA ° Notice of availability ° Public hearing
	Consider and respond to comments	
	° Determine compliance document(EIS or FONSI)	
	° Prepare preliminary Final EA ° Prepare FONSI	° Prepare preliminary Final EIS
	° Internal review	
	° Revise	
	° Document Approval	
° Sign CEC	° Sign FONSI	° Print final EIS ° File with EPA ° Notice of availability
	° Print final EA and FONSI ° Distribute ° Notify public	
	° 30 day No Action period	
		° Prepare and Review ROD ° Sign ROD ° Notify Public
	° Prepare environmental commitment plan	
	° Authorization and Funding	
° Initiate action		
° Conduct environmental follow-up		

ENGINEERING CRITERIA

PLAN FORMULATION AND COMPARATIVE ANALYSIS

The basic goal of project planning is to formulate a plan that provides the most return to the individual, to the economy and to society as a whole, when compared to the amount of limited resources (land, water, financial, human) utilized to generate the return. In other words, formulation is the process of coming up with the plan that generates the most return for the least expenditure of resources. Formulation for water resource development requires constant orientation of all work toward this basic goal, whether working with land classification, hydrology, design data, drainage, cost estimates, benefit calculations or economic evaluations. Engineers, economists and technician specialist engaged in different facets of the plan must constantly coordinate with the planning engineer (investigation coordinator) directing the investigation. Lack of such coordination results in misdirected efforts, time-consuming delays, unnecessary expenditures, and may result in an inadequately conceived project.

In practice, the process begins with the evaluation of a large number of alternatives with a low level of technical information, and proceeds to a fewer number of alternatives with a higher degree of refinement of technical data until the optimum plan is found. The process is iterative. For example, an alternative that was previously eliminated may need to be considered again if technical information that was collected after the alternative was evaluated changes the circumstances of the evaluation. The practical application of the proper engineering and economic principles and criteria throughout the investigations, along with technical engineering knowledge, skill, and imagination, and an objective and openminded approach, is necessary to reasonably assure the conception of the superior development plans that may otherwise be overlooked or never conceived.

The basic criterion in plan formulation is that the net benefits, that is the excess of total project benefits over total project costs, shall be a maximum. Social, environmental, and government policy factors can also be taken into account in plan formulation, but in general, these aspects should not be considered until at least one iteration has been completed on an entirely economic basis.

COMPARATIVE ANALYSIS CONCEPTS

It should be recognized during plan formulation studies and during evaluation of alternative plans that all calculations need be no more accurate than is necessary to properly evaluate the alternatives in relationship to each other. Relevancy with respect to principles and criteria is equally, if not more important than precise and detailed calculations. The engineering and economic estimates made during appraisal level planning will not be of high precision because they are based on appraisal and semidetailed investigations and analyses. What is more important is that the estimates and calculations be done in such a way that the alternatives are comparable to each other. The purpose of the formulation studies is to determine the best alternative, not to determine whether that alternative, or any other is feasible. The determination of project feasibility will be done at the feasibility level, where much more detailed and accurate information will be available.

Comparative analyses is a term used to describe the procedures that are used to evaluate alternatives in such a way that they can be compared to each other. Appraisal level procedures are used for estimating the suitability for the final use of the water, the availability of water, and for estimating

costs and benefits. It is important that the same techniques be used on each alternative so that comparability is achieved. Comparing costs of arrayed alternatives where the estimates of one alternative are based on a different, perhaps more elaborate methodology, against another estimate from a cost curve would produce noncomparable estimates which would defeat the stated purpose of making a "comparative analysis."

The emphasis of time and effort needs to be on those items that can effect how one alternative compares to the others. Items that are common to all alternatives or that have small significance in relation to their impact on costs or benefits should receive less emphasis. The planning engineer (investigation coordinator) needs to be very aware of these factors to get the most from the efforts of the engineers, economists, and other technical specialist working on the investigation.

A display of project alternative-plans which have been conceptualized can be displayed for comparison on an arrayal table. The purpose of preparing an arrayal is to display the comparative advantage and disadvantage of each alternative. The arrayal table is used to summarize the estimates and analysis which have been completed since the conceptualization of alternative plans and is used to provide the following: (1) documentation of all alternatives considered, (2) a place where all plans can be compared on a single large sheet, (3) a format for displaying alternatives for use in reports, and (4) the information required to select a preliminary plan complete with costs, economic analysis, and trade-offs.

Comparative alternative arrayals are used to eliminate plans that do not merit detailed study or warrant additional investigation. Justification of a plan is not found in the benefit-cost ratios generally arrayed at the bottom of a table. The arrayal may show all plans above or below unity but this neither shows justification or the lack of justification. It only illustrates the relative attractiveness among the plans arrayed.

The arrayal table is an economic tool for assisting in sizing or scoping the project. The intent is to array alternatives that appear practical and select a preliminary plan or plan concept that appears worthy of more detailed consideration. Ultimately a single set of facilities must be selected on which to complete a detailed investigation so feasibility can be determined, and cost repayment studies completed.

In summary, the following should be kept in mind when working with comparative studies:

(1) Comparative studies provide a common basis for evaluating all reasonable alternatives.

(2) Comparative studies are used to select the best engineering system that will satisfy project objectives.

(3) Comparative studies do not determine project feasibility.

A sample format for an arrayal table follows (table 5).

ENGINEERING COST ESTIMATING CRITERIA

Cost estimates for use in the initial comparative analysis of alternatives will be at the appraisal level. Estimates will be based on existing information where available. Reclamation cost indexes will be used to bring existing cost information to the same price level date for use in comparing the cost of

Table 5

FN: COMP_ANA

Comparative Analysis Table

14–Dec–94

Alternative	1 Description	2	3	4	5	n	n+1
Water Supply (Ac–Ft/Yr)							
Features & Costs (Jan 1994 Prices)							
Total Construction Cost	0	0	0	0	0	0	0
Interest During Const							
Total Investment	0	0	0	0	0	0	0
Annual Equivalent Costs							
Amortized investment (8%, 100 yr)	0	0	0	0	0	0	0
OM&R							
TOTAL ANNUAL COST	0	0	0	0	0	0	0
UNIT COST ($/AF)							
or other							
desired ratios for comparison							
Other types							
of information							
for comparative analysis							

alternatives. Some of the approximating techniques which will be used when existing estimates are not available include using cost estimating curves, comparisons with constructed projects, and the use of computer estimating programs. Simple sketches and rough general designs are generally adequate. These procedures are used to obtain approximate costs in a short period of time. Only in the case of major structures will design layouts be made for appraisal estimates and this only after significant reduction in the number of alternatives has occurred - usually only on a final plan feature.

An allowance of 25% will be made for contingencies. Contingencies are an allowance against adverse or unanticipated conditions from the available information. Ordinarily, the purpose of contingencies is to pay contractors for changed site conditions, overruns on quantities, etc. and not for changes in project planning. The contingency is added to each project feature to obtain the "field" cost.

An allowance of 30 percent will be made for administrative, engineering and other indirect costs and added to the field cost of each feature. The allowance for these items is also referred to as non-contract costs.

OPERATION, MAINTENANCE AND REPLACEMENT COSTS

Operation, maintenance, and replacement (OM&R) costs are the value of goods and services needed to operate a constructed project and make repairs and replacements necessary to maintain the project in sound operating condition during its economic life. These costs will also be estimated at the appraisal level by indexing, comparisons with existing projects or derived from cost curves. Power costs will be based on an average prevailing rate for the general area.

PRICE LEVEL

All cost estimates are to be at the current price level. For certain groups of alternatives where existing cost levels are already available at a uniform date near current levels, that cost level can be used to eliminate alternatives and only the surviving ones would need to be placed at the current price level.

INTEREST RATE

The current market rate of interest is used for plan formulation and evaluation.

INTEREST DURING CONSTRUCTION

Interest during construction (IDC) will be estimated assuming a uniform rate of construction over a period of years based on judgement (or if previously estimated, that amount of years will be used) using the current market rate of interest.

INVESTMENT

The total investment will be the sum of construction cost and the IDC.

ANNUAL EQUIVALENT COST

The total annual equivalent cost will include the amortized investment at the current market rate of interest over a period of 100 years plus the annual operation, maintenance and replacement cost plus any power cost.

DISPLAYING COSTS

It is recommended that investments be rounded to the nearest $1000 and annual costs to the nearest $100. This makes numbers easier to read and provides for a uniform format for reporting costs without any significant loss of accuracy for appraisal level planning.

FEASIBILITY COST ESTIMATING CRITERIA

Feasibility cost estimates are used for determining the economic feasibility of a project and for showing the probable sequence and cost of construction. One or more plans may be selected from appraisal level studies for feasibility-grade study. The estimates may be used to chose between plans and alternative locations. Feasibility estimates are based on information obtained during planning investigations which should provide sufficient design data to permit the preparation of preliminary layouts and designs from which approximate quantities for each kind or class of material and labor may be obtained.

Feasibility cost estimates are included in feasibility reports in order that the approval authority may consider the authorization of the project, and in definite plan reports in order that the approval authority may be apprised of the latest estimates of fund requirements prior to construction.

Estimates

Surveys to obtain field data for design purposes are an essential part of project investigations. These surveys include topography and alinement, surveys, geologic exploration, and the preparation of preliminary designs and estimates.

Estimates of cost of construction for feasibility level planning should be based on unit prices applied to detailed quantity estimates which are obtained from the feasibility designs. It is suggested that the January 1994 price level (or January 1995 if available) be used. Allowances should be added for contingencies to cover items which are not specifically included in the estimate. An additional allowance should be made for future investigations, engineering, contract administration, and other overhead. The summation of the above costs constitutes the field cost of the structure. To this must be added an estimate of cost of right-of-way for the structure being considered and any relocations such as railroads, highways, roads, water systems, and other public utilities.

Unlisted Items

Generally, an allowance for unlisted items in feasibility cost estimates vary between 2 and 15 percent of the listed items. The percentage to be used is determined by the persons preparing the pay items and quantity takeoffs. When a feasibility estimate is in final form approaching specifications quantities, the allowance for unlisted items may be reduced to the lower end of the range.

Conservative judgement should be considered as a contingency for quantity changes due to receiving more design data and also to eliminate itemizing the pay items in the estimate that will have little influence on the total cost.

Contingencies

This line item is included in all appraisal and feasibility estimates. The purpose for contingencies is to pay contractors for overruns on quantities, changed site conditions, order for changes, etc. Contingencies are considered as funds to be used after construction starts and not for design changes or changes in project planning. Feasibility estimates should have 20 percent added for contingencies.

FEASIBILITY ESTIMATES OF OPERATION, MAINTENANCE, AND REPLACEMENT

Operation, maintenance, and replacement (OM&R) costs are the value of goods and services needed to operate a constructed project and make repairs and replacements necessary to maintain the project in sound operating condition during its economic life.

Operation and maintenance costs normally will include: (l) salaries of personnel for operation; (2) cost of labor, plant and supplies required for ordinary maintenance and repairs; (3) supervision; (4) applicable overhead; and (5) periodic inspection and evaluation.

Replacement costs are for major components of a project that are expected to be replaced before the end of the project evaluation period.

The cost of operating and maintaining the project and providing for replacement of major items should be developed from a detailed analysis of project requirements. It should be based upon a plan of operation which includes an adequate operating organization, necessary equipment and supplies, and replacements needed to maintain the project throughout the repayment period. The procedure for preparing feasibility estimates involves estimating personnel, equipment, supplies and materials, administrative and general expense.

The following principles should govern the preparation of a cost estimate for operation, maintenance, and replacements:

(a) Operation and maintenance should be adequate to insure service consistent with economy and efficiency.

(b) Maintenance should be of the preventive type, planned to keep all project features and equipment in service consistent with sound business practice.

(c) Replacements should be made to keep project features and equipment in sound operating condition during the repayment period and to offset depreciation and obsolescence so far as is consistent with sound business practice. Replacements are considered to be those items which exceed usual project maintenance capabilities or which will impose unusual financial difficulties. The replacement component may be computed on a straight line basis without interest or on a sinking fund basis with an interest rate established by agency policy.

(d) Cost should include an appropriate allowance for overhead expenses.

(e) Cost should include the cost of power for pumping when such power is purchased from nonproject facilities.

Wastewater treatment provides one example of the kind of engineering criteria used by the DOI. The design of a wastewater treatment plant is driven by three major criteria. The first criterion is to determine where the treated wastewater will be disposed. The second criterion is to design a system with affordable operation and maintenance (O&M) costs. The third criterion is to design a system with an affordable capital cost.

Determining where the treated wastewater will be disposed narrows the options with which an engineer can work. Water quality discharge requirements into surface water or groundwater aquifers are usually determined by the State. The disposal decision sets the level or quality of the treatment and gives the engineer direction for choosing possible treatment processes based upon the quality of the feed to the plant. If the quantity of water to be treated is small, it may not be necessary to build a treatment plant, and septic tanks and leach fields could be used. If enough land and an appropriate climate are available, it may be possible to use evapotranspiration pits or evaporation. Whichever solution is recommended, it must take into account the quantity and quality of the wastewater to be treated and the quantity, quality, and disposal location of the treated wastewater.

The second and third criteria depend on finding viable solutions to the disposal of treated wastewater. It would be very unusual to be able to build a treatment system with low O&M costs and low capital costs. Engineering judgement and an understanding of the specific situation need to be used to balance these costs. It is possible to build a plant for lower O&M costs, but the capital costs could be higher.

Checklist

What is the quantity of water to be treated (is a treatment plant needed)?

If the quantity is small enough, could septic tanks and leach fields be used?

Will the groundwater be allowed to receive primary, secondary, or tertiary treated wastewater?

If there is enough land and appropriate climate, could evapotranspiration pits or evaporation be used for treated wastewater disposal?

If a treatment plant is needed, is there a source for the discharge of treated wastewater?

What are the water quality requirements in order to discharge into surface water or groundwater aquifers (the States are usually the authority)?

What is the quality of the incoming water? Does it contain industrial as well as municipal waste?

Are the proposers willing to bear the costs of operating and maintaining the plant into the foreseeable future?

Can the treated wastewater be reused for irrigation of non-food crops?

Will the proposed plant design meet the discharge quality and quantity requirements?

Are the engineering costs and construction cost estimates reasonable?

What other technologies or solutions were considered?

ECONOMIC AND FINANCIAL CRITERIA

NATIONAL ECONOMIC DEVELOPMENT (NED) BENEFITS GENERATED BY THE PROJECT COMPARED TO COSTS[1]

NED benefits are a measure of the change in national welfare attributable to a project. A project would meet NED benefit criteria if the estimated benefits generated by a project exceed the project costs. If benefits exceed costs, then the project should be undertaken because national welfare is improved if the project is completed. For example, if a project is estimated to generate $1.0 million in benefits to the nation at a cost of $600,000, then the net benefits of the project to the nation would be $400,000 and the project would be justified from an NED perspective. Techniques accepted by the U.S. Water Resources Council for use in estimating NED benefits are presented in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (U.S. Water Resources Council, March 10, 1983).

If there are two competing projects, the NED benefit criterion would be to choose the project with the greatest net benefits, assuming funds are available for only one project. If funds are available for several projects, then the combination of projects that maximizes net benefits and remains within the budget constraint should be chosen.

In order to compare project benefits and costs, methods for estimating benefits and costs are needed. Estimating project costs is fairly straightforward. Engineering estimates of project costs can be used along with the appropriate discount rate to estimate the present value of project costs. Project benefits are more difficult to estimate because market-based prices which reflect the benefits of project output are not always available. The appropriate NED benefit evaluation procedure depends on the type of project under consideration. The following four sections briefly describe methods for estimating municipal and industrial (M&I) water supply benefits, agricultural benefits, recreational benefits, and urban flood damage benefits.

Industrial Water Supply Benefits

The conceptual basis for measuring M&I water supply benefits is society's willingness to pay for the improved water supply. For a project where the price of water reflects the marginal cost (the added cost associated with an additional unit of water) of water, the price can be used to estimate willingness to pay. Data obtained from contingent valuation surveys can also be used to estimate willingness to pay. Benefits can also be estimated using the cost of the most likely alternative. However, the most likely alternative method cannot be used to estimate the benefits of non-structural measures that alter

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[1] NED benefits and other concepts in this section are from the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (Reclamation, 1983).

water use because structural alternatives usually change the level of national output and because use-altering measures may have lower direct resource costs than measures based on higher levels of output. In other words, the most likely alternative may not be comparable with the project under consideration.

The basis for measuring the benefits of wastewater treatment projects, water quality improvement projects, and solid waste treatment projects is the same as for water supply projects. The willingness to pay for improvements provided by a project is the benefit of the project. These benefits could be measured using contingent valuation methodologies or the cost of the most likely alternative for structural measures.

Agricultural Benefits

Agricultural benefits are the value of increased agricultural output generated by a project or the reduced cost of producing the same level of output. These benefits are derived from increased production, reduced production input costs, or increased economic efficiency in production. Agricultural benefits are generally limited to production of basic crops (rice, cotton, corn, soybeans, wheat, milo, barley, oats, hay, and pasture) where production is generally limited by the availability of suitable land. Agricultural benefits can be measured using either a farm budget analysis or land value analysis. The farm budget method measures benefits by calculating the increase in net farm income, resulting either from an increase in production or a decrease in input costs. The increase in net farm income is the difference between expected net farm income with the project in place and expected net farm income without the project. The land value method measures improved land productivity or reduced production costs as they are reflected through the market price of land.

Recreational Benefits

Recreational benefits arise as a result of recreational opportunities created by a project. Recreational benefits are measured in terms of willingness to pay. Benefits of projects that increase the supply of recreational opportunities are measured as the willingness to pay for the additional supply. Benefits of projects that alter willingness to pay are measured as the difference between the without- and with-project willingness to pay. Most recreational opportunities are provided by the public sector rather than by private entities; therefore, it is extremely difficult to estimate demand (benefits) directly from market data. Methods for estimating the recreational benefits from a project include the travel cost method, the contingent valuation method, and the unit day method.

Urban Flood Damage Benefits

Urban flood damage benefits result from a project that reduces urban flood hazards. Urban flood damage benefits can be categorized as: inundation reduction benefits, which result from reduced inundation damages due to the project; intensification benefits, which represent increased income to activities within the area with the project; and location benefits, which result from activities that are possible in an area with the project that would not be possible without the project. Market-based cost estimates can generally be used to estimate these benefits. It should be noted that any agricultural flood benefits, measured as reduced damages, from a project should be included in the agricultural benefits as either increased production or reduced production costs.

REGIONAL ECONOMIC DEVELOPMENT (RED) IMPACTS GENERATED BY THE PROJECT

Regional impacts represent changes in income, employment, and output in a region where a proposed project would be undertaken. Unlike national-level benefits, regional impacts measure only the impacts to the smaller region rather than the nation as a whole. Positive regional impacts can result from construction activities, O&M of a facility, and new development opportunities from the services provided by the project. A project that generates NED losses can generate positive RED impacts to the region.

The most common method of estimating regional economic impacts from a project is through the use of regional multipliers. These multipliers represent the total impact of dollars spent for an activity on a regional economy. These multipliers are available from a variety of sources with different levels of sophistication.

The RED criterion for a project is to pick the project that meets the larger water supply/environmental/social goals and maximizes the positive income and employment impacts on the region. This assumes that increased income and employment would be desirable for the region.

FINANCIAL CRITERIA

Ability to pay is the amount households, businesses, and farm operators could pay towards the cost of project construction and still meet reasonable living standards and profit levels. Estimating household ability to pay can be accomplished using household budgeting procedures where such living expenses as housing, food, insurance, transportation, taxes, and other necessary expenses are deducted from income to determine the remaining residual income that could be paid towards project costs. Estimating the ability to pay of businesses is similar except that business expenses and a reasonable profit would be deducted from sales revenues. Farm budgeting procedures can be used to estimate the ability of farm operators to pay for an irrigation project after farm expenses and a family living allowance are deducted from crop sales revenues.

An important consideration in estimating ability to pay is the expected impact of the proposed project on population, business growth, and income. Construction of a water supply or water treatment project could encourage the location of households and new businesses in the area. This could boost the economy of the region and potentially increase overall ability to pay. Therefore, when estimating ability to pay, the impact of the proposed project on the local economy must considered. A project that appears infeasible given current conditions without the project may be feasible if growth and improved living standards with the project are accounted for in the analysis.

The ability to pay of project users is important if the entity funding a project requires repayment of the project loan. If the ability to pay of project users is less than the full cost of the project, then the entity funding the project cannot expect full repayment. Ability to pay must be greater than or equal to the cost of the project for full repayment. Otherwise, some outside funding sources are necessary to make the project financially feasible.

Ability to pay applies to the repayment of project capital costs as well as ongoing annual operation, maintenance, and repair (OM&R) costs of the project. If OM&R costs cannot be met, then an outside funding source must be found on an annual basis to make the project feasible, or a fund must be

established from which interest payments would cover OM&R costs. If the annual OM&R obligation can be met by the water users, but capital construction costs cannot be met, then a one-time funding source is needed to make up the difference.

Outside funding sources can be used to supplement ability to pay and reduce the repayment burden of project users. Outside funding sources can originate from Federal or State government and private foundations which back rural economic development programs through grants. These funding sources can take the form of grants, which are not paid back, low-interest loans, or technical assistance. Examples of state financing sources for water-related projects include the California State Fund and Water Quality Control Fund Loan Program in California, the Laboratory Fee grant program in New Mexico, and the Community Loan Fund in Texas. Several Federal financing sources are also available, including:

> USDA, Rural Development Administration - Provides loans for the installation, repair, improvement, or expansion of water and wastewater systems. These are available to rural areas or communities that serve fewer than 10,000 people. Program criteria along with water system characteristics determine the interest rate on the loan. The lowest loan rate applies to projects needed to meet health or sanitary standards in areas where the median household income is below the poverty level.
>
> Department of Housing and Urban Development - Grants through the Community Development Block Grant Program (on average, grants cover 50 percent of project costs). Targeted toward drinking water systems serving low-income households.
>
> Department of Commerce, Economic Development Administration's Public Works and Development Program - Must be a drinking water project directly related to future economic development in an economically distressed area. Funding is limited to 80 percent of the project cost.
>
> Indian Health Services, Department of Health and Human Services - For projects undertaken by American Indians and Alaska Natives. No matching funds are necessary and IHS grants can be consolidated with those from other agencies.
>
> REA - No-interest loans for projects that result in a sustainable increase in the productivity of economic resources in rural areas and lead to higher levels of income for rural citizens. Available for up to 10 years and up to a cost of $100,000.

Another potential source of project funding is through direct appropriation of funds through Congressional legislation.

When alternative grant funding is not available, annual ability to pay is clearly less than the annual cost of the project, and reasonable estimates of growth in ability to pay with the project will not increase ability to pay enough to pay for the project, then the project would be considered financially infeasible. Under these conditions the project sponsor could not expect full repayment. If full repayment is a condition that must be met for project acceptance, then a project that has insufficient ability to pay would be rejected.

ENVIRONMENTAL CRITERIA

The key Federal law that allows for a flexible planning process and the ability to incorporate other processes of related laws and Executive Orders is the National Environmental Policy Act (NEPA). NEPA is a policy statute that promotes an open planning process with public outreach, analysis of alternatives, and evaluation of impacts to man's environment, and that supports a decision-making process by a Federal agency or group of agencies (the use of co-sponsoring agencies). The NEPA environmental document can incorporate other related environmental law processes (such as a Section 7 environmental assessment and consultation with the Service under the Endangered Species Act, or a Service Coordination Act planning report on a proposed water resource project, or the section 106 consultation on cultural resources impacts under the National Historic Preservation Act).

ENVIRONMENTAL COMPLIANCE

NEPA makes environmental disclosure a part of the mandate of every Federal agency and department prior to actions potentially affecting the environment. The Federal NEPA requirements are described in the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1000-1508). In addition, each Federal agency has prepared instructions detailing its requirements and procedures under NEPA.

NEPA requires Federal agencies to prepare environmental compliance documents on Federal actions. Court interpretations also require Federal agencies to analyze impacts of State, local and private actions when they are "federalized" through Federal financial assistance or Federal permits.

Adequate compliance under NEPA includes complying with other environmental regulations. These include the Endangered Species Act, Service Coordination Act, and regulations on biological resources, floodplains, wetlands, cultural resources, recreation, air quality, water quality, land use, and hazardous and toxic substances.

INDIAN TRUST ASSETS COMPLIANCE

The Secretary of the Interior is the trustee for the United States on behalf of Indian tribes. All Department of the Interior agencies share the Secretary's duty to act diligently to protect and maintain Indian trust assets. Secretarial Order No. 3175, issued in November 1993, clarified the trust responsibility for bureaus and department offices and directed them to produce Indian trust directives and procedures.

Among DOI agencies, Reclamation implemented Secretarial Order 3175 when it issued a June 1993 memorandum on Indian trust asset policy. Reclamation trust asset procedures were consequently produced.

The policy memo defined Indian trust assets as legal interests in property held in trust by the United States for Indian tribes or individuals. Reclamation, policy, as defined in the memo, is to carry out its activities in a manner that will protect trust assets and avoid adverse impacts when possible. When adverse impacts cannot be avoided, Reclamation is to provide appropriate mitigation or compensation. The policy memo directed Reclamation staff to produce Indian trust asset procedures to be included in Reclamation's *National Environmental Policy Act (NEPA) Handbook*.

The Reclamation NEPA Indian trust asset procedures were issued to Reclamation staff in November 1993. The procedures define trust assets and the process to follow in identifying potentially impacted trust assets, and require trust asset-labeled sections in environmental compliance documents. In order to identify trust assets, Reclamation is directed to consult with tribes potentially affected by a project, and to review relevant treaties, statutes, executive orders, and similar agreements.

EXEMPTIONS FROM NEPA

Since NEPA is very broad, very few actions do not require NEPA compliance (even an emergency action is not strictly exempt). NEPA does not expressly apply outside the United States, but its intent has been generally applied internationally by a Presidential Executive Order. Some other actions exempt from NEPA are:

- All of EPA's action under the Clean Air Act and many of its actions under the Clean Water Act.
- Congressional legislation expressly exempting specific projects from NEPA compliance.
- Others, as noted below.

LIMITATIONS ON ACTIONS

Until a NEPA compliance document is approved, no action shall be started that would have an impact on, or preclude the choice of, reasonable alternatives to the proposed action. This includes commitment of resources that would advance the proposed project to a point from which retreat may be impossible or impractical. This does not include the reasonable commitments of resources to carry out the necessary studies upon which the environmental compliance and decision document would be based.

LEVELS OF ENVIRONMENTAL COMPLIANCE

To the extent possible, the degree of environmental impacts and the appropriate level of compliance are determined early in the process. If it is apparent that the proposed action is minor, and that there would be no adverse environmental impact, the action may only require a categorical exclusion (CE). Certain major actions having obvious and significant impacts, constituting a significant commitment of resources, or involving high levels of public controversy would require an Environmental Impact Statement (EIS). Between those actions having a significant impact, and those having nearly none, there are a large variety of actions where it is difficult to determine the significance of environmental impacts. In these cases, preparation of an Environmental Assessment (EA) is the appropriate starting point. More detailed descriptions of the three levels of NEPA compliance follow.

CATEGORICAL EXCLUSION (CE)

Each Federal agency has identified categories of actions which do not individually or cumulatively have a significant effect on the environment and which are therefore exempt from NEPA. These activities are generally confined to areas already impacted by development activities, are considered minor, and have localized impacts.

The Federal agency normally prepares a CE checklist to verify exemption of an action from further compliance. Checklist completion usually takes from one to three months.

Although there are no standard format requirements for CE's, the format usually includes a description of the proposed action, an explanation of why the proposed action qualifies as a CE under agency procedures, and a checklist verifying that no circumstances exist that would affect the following resources:

- Public health and safety
- Cultural resources or other unique geographic features
- Highly controversial actions
- Highly uncertain effects or unknown risks
- Precedents for future actions
- Cumulative effects that might be significant
- Sites on or eligible for the National Register of Historic Places
- Threatened or endangered species
- Wetlands or floodplains
- Violation of Federal, State, local or tribal environmental regulation
- Indian trust assets
- Any other impacts that might be significant

A CE may include an environmental evaluation (a report evaluating checklist conclusions), a summary of public contacts, and environmental commitments that reduce potential impacts to a less than significant level.

ENVIRONMENTAL ASSESSMENT

An environmental assessment (EA) is prepared for an action which does not meet the criteria for a CE but whose effects are not defined well enough to permit the early determination that an EIS is required. An EA provides sufficient analysis to clarify the issues and determine whether a project would have significant impacts. Based on the EA, an EIS or a finding of no significant impact (FONSI) would be prepared for NEPA compliance (A FONSI is a decision document and allows the action to be carried out). Completion of an EA normally takes 9 to 12 months. An EA includes the following:

- Briefly provides sufficient evidence and analysis for determining whether to prepare an EIS or FONSI.
- Facilitates preparation of an EIS when one may be necessary.
- Includes brief discussions of the need, alternatives, environmental impacts, and a listing of agencies and persons consulted.

ENVIRONMENTAL IMPACT STATEMENT

An environmental impact statement (EIS) is required when it is determined that a major Federal action would have significant effects on the environment and/or that there is considerable public controversy about the project. In addition, an EIS may be prepared on any action at any time in order to assist planning and decisionmaking. The EIS is a detailed written document which undergoes a formal review process. Completion of an EIS normally takes 18 to 24 months.

The nature of a major action and its resulting significant environmental effects may make the need for an EIS apparent from the very beginning. For some actions, however, it may not be apparent whether an EIS is required. For these actions an EA may be prepared to determine whether an EIS or FONSI is the appropriate compliance.

"Significance" is often a nebulous, hard-to-define term that is used to define the level of environmental effects. Courts usually determine significance on a case-by-case basis. CEQ regulations contain a list of criteria to aid agencies in identifying actions that may have significant environmental effects. The two major criteria are context and intensity.

Context - considers the local, regional, national, duration of project effects.

Intensity - relates to the severity of environmental impacts.

Other criteria used by CEQ to determine significance are:

- Beneficial or adverse effects
- Effect on public health and safety
- Effect on a unique geographical area
- Controversial effects
- Highly uncertain, unique, or unknown risks
- Actions that set a precedent for future significant effects
- Cumulative effects
- Effects on historic, scientific and cultural resources
- Effects on endangered species
- Actions that violate Federal, State, or local law

CONTENTS OF EA AND EIS

CEQ Regulations present a format for the EIS that would "encourage good analysis and clear presentation of alternatives . . .." For practical purposes, the formats of EIS's and EA's are usually not significantly different. Table 6 compares the formats based on CEQ regulations.

Table 6.—Standard formats for EA and EIS

EA	EIS
• Purpose and Need for Action • Alternatives Including Proposed Action • Affected Environment • Environmental Consequences • Environmental Commitments • Coordination/Consultation • Distribution List • Attachments (if any)	• Cover Sheet • Summary • Table of Contents • Purpose and Need for Action • Alternatives Including Proposed Action • Affected Environment • Environmental Consequences • Environmental Commitments • Coordination/Consultation • List of Preparers • Distribution List • Index • Attachments • Appendices (if any)

ALTERNATIVES—FORMULATION AND ANALYSIS

The interdisciplinary team formulates a realistic range of alternatives that reasonably could be considered and that would accomplish project objectives. Alternatives may be formulated after scoping to address issues and concerns identified during the scoping process. The EA or EIS explains the process used to formulate alternatives. The "no action alternative" is included in the evaluation of alternatives. For alternatives which were eliminated from detailed study during screening, the reasons for their having been eliminated is discussed.

CONCEPT OF NO ACTION

The important planning concept of no action envisions a future without the proposed action or its alternative courses of action and provides the baseline against which proposed future courses of action can be measured. The no action condition or alternative embodies projections of current conditions to the most reasonable future that could occur during the life of a proposed project. It provides the most direct means of determining a proposed project's potential value when compared to the value of nonproject change, and of determining the net effects of proposed actions. This condition must be formalized as a discrete alternative under NEPA regulations governing environmental impact statements.

BASELINE CONDITIONS INVENTORY

The baseline conditions of the affected environment are inventoried and described. This includes those resources (biological, social, cultural, etc.) that could potentially be affected by the proposed action and its alternatives. These resources could be located in the study area or at some distance from it. In some cases, considerable data may exist in various forms on resources of the project area(s).

Inventories and studies are often designed to address issues developed during scoping. The results of these studies are used to describe the affected environment and environmental consequences in the EA or EIS. In some cases, baseline data collection would be designed to facilitate effective monitoring of potential impacts or mitigation. Examples of baseline inventories conducted by Reclamation are as follows.

- Identify, evaluate and map plant communities and/or wildlife habitat types using aerial photography, GIS data bases, ground surveys, and habitat evaluation procedures.
- Delineate jurisdictional wetlands.
- Identify habitats for endangered, threatened, and special status plants and animals.
- Establish baseline conditions of water quality and aquatic systems.
- Conduct instream-flow studies.
- Compile baseline hydrological data for project area watersheds including average annual and monthly flows and peak flows.
- Conduct cultural resources surveys.
- Compile baseline visitor-use data on recreational activities.

Team members use the information collected during the inventory to write sections of the "Affected Environment" chapter in the EA or EIS. CEQ regulations provide the following guidance to describe the existing environment:

> *The environmental impact statement shall succinctly describe the environment of the area(s) to be affected by the alternatives under consideration. The description shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced . . .*

IMPACT ANALYSIS

This element of the EA or EIS process forms the scientific and analytic basis for comparisons of alternatives, including the proposed action and no action alternative. The environmental impacts of all alternatives are evaluated at the same level of detail so that effects of alternatives can be distinguished. The affected resources identified as issues are addressed. Resources determined to be minor are only mentioned.

For an EA, the impact assessment is concise and briefly provides sufficient evidence and analysis for determining whether to prepare a FONSI or EIS. Analysis would be limited to issues and potentially significant project impacts. If the project would have no impacts upon environmental areas of concern (i.e., wetlands, endangered species, cultural resources, recreational areas), this would also be identified. The impact analysis considers the following:

- Beneficial and adverse impacts;
- Short and long-term impacts;

- Local, regional, and ecosystem-wide impacts
- Irreversible and irretrievable resource commitments;
- Cumulative impacts.

In an EIS, the impact analysis covers the same types of impacts listed above. However, the impact analysis may require a greater level of detail to address issues of greater controversy and complexity.

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

When the responsible official determines that impacts described in an EA would not "significantly" affect the environment and that preparation of an EIS is not warranted, a FONSI is prepared according to the CEQ regulations. The FONSI should substantiate why the impacts described and analyzed in the EA are not significant and should reference any mitigation measures adopted to reduce or eliminate impacts. The FONSI is circulated for a 30-day review prior to being finalized. No action can be taken until the FONSI is complete.

RECORD OF DECISION (ROD)

When the responsible official determines that effects are "significant," a Notice of Intent to prepare an EIS is published in the Federal Register. Following preparation of the final EIS, a ROD is prepared to document the agency's selection of an alternative, discuss the factors evaluated in the decision, summarize the environmental commitments and mitigation, and describe the monitoring and enforcement program to assure accomplishment of the mitigation measures. The ROD cannot be executed until 30 days following filing of the final EIS. No action can be taken until the ROD is complete.

DETERMINATION OF LEAD AGENCY AND COOPERATING AGENCIES

NEPA places the responsibility for environmental compliance on Federal agencies. In many cases only one Federal agency has authority over an action. However, cases also frequently arise in which more than one Federal agency is responsible. NEPA does not indicate which agency should take the lead.

Federal, State, or local agencies, as long as they include at least one Federal agency, may act as joint lead agencies. In some cases, Federal agencies may delegate the duty to prepare EA's and EIS's to State or local agencies or to private consultants or private applicants provided the Federal agency retains sufficient control of or responsibility for the preparation process.

At the earliest opportunity, the lead agency determines whether any other Federal agencies have jurisdiction by law or special expertise with respect to any aspect of the proposed action. The lead agency may request any such agencies to be a cooperating agency. In addition, an agency may request the lead agency to designate it a cooperating agency. Cooperating agencies assume responsibility for the development of information and the preparation of environmental analyses at the request of the lead agency.

INTERDISCIPLINARY TEAM

The CEQ regulations mandate an interdisciplinary approach to ensure the integrated use of the natural and social sciences and environmental engineering. The interdisciplinary approach evaluates the proposed project from the viewpoint of all relevant disciplines. This is different from a "multidisciplinary" approach that conducts evaluations independent of team interaction and review. Team size, composition of disciplines, level of participation, and qualification of members are determined by the scope of study, issues, degree of controversy, and level of complexity.

PUBLIC INVOLVEMENT

Public involvement is required by CEQ to ensure inclusion of the public in a timely manner in implementing the NEPA procedures. Public involvement programs provide opportunities for the public to give information to the lead agency and cost-share partners in a study or action as part of the process of scoping issues, forming recommendations, and making decisions. Public involvement therefore necessitates an interactive exchange of information with the public.

ISSUE IDENTIFICATION

The identification and evaluation of issues is critical to the effective application of NEPA. An issue can be viewed as a specific action on a specific resource which causes a specific problem. CEQ regulations clearly state:

> *NEPA documents must concentrate on the issues that are truly significant to the action in question, rather that amassing needless detail*

Scoping

An early process is used to identify the scope and significance of issues related to the proposed action(s). Identification of issues may involve the following: 1) review of pertinent literature and environmental documents to ascertain issues from similar projects, 2) interviews with specialists from affected agencies, and 3) public involvement.

Following issue scoping, the project planning team determines which issues should receive detailed analysis. In many cases, related issues may be combined to streamline the analysis. The significant issues are summarized in the EA or EIS.

Agency Contacts

Federal, State, and local agencies, governments, and conservation organizations are briefed early in the planning process to reduce delays and resolve issues prior to release of the completed document. These entities should be given enough information about the proposed projects to be able to objectively communicate their concerns and level of cooperation to meet NEPA's interagency consultation and coordination requirements. Staff specialists from these agencies may be interviewed to determine issues and concerns, and to obtain pertinent technical information.

FISH AND WILDLIFE COORDINATION ACT (FWCA)

The objective of this act is to provide fish and wildlife conservation equitable consideration during planning for water-resource development programs. Agencies are required to consult with the U.S. Fish and Wildlife Service (Service) during the planning stage of water development projects. Projects subject to the FWCA include those that would "modify any stream or other body of water . . .." The results of coordination with the Service along with their recommendations are summarized in the environmental compliance document.

ENDANGERED SPECIES ACT COMPLIANCE

Section 7 of this Act requires Federal agencies to ensure that their activities do not adversely affect the continued existence of threatened or endangered species or their critical habitats. Lead agencies must consult with the Service to determine the potential impacts that a project may have on protected species. The EA or EIS must address the beneficial and adverse effects of the proposed action on species which are listed, proposed for listing, or are candidates for listing.

The Service has established the following informal and formal consultation procedures to comply with Section 7 which can also be used for effective impact analysis during the NEPA process.

- The lead agency requests a list of threatened, endangered, proposed, and candidate species from the Service.
- The lead agency completes a biological assessment describing the proposed action and evaluating its effects on the species of concern and their habitats.
- The Service reviews the biological assessment and prepares a biological opinion. In a "may affect" situation the opinion may include recommendations and reasonable and prudent alternative actions that can be incorporated in a manner consistent with the project's purpose.
- When the Service determines that the project may jeopardize the continued existence of a listed species, the lead agency requests continued formal consultation with the Service to determine reasonable options, if available, to avoid the adverse effect.

The results of consultation with the Service are incorporated into the EA or EIS as follows:

- The "Alternatives" chapter includes measures to protect threatened and endangered species that would be incorporated as project features (i.e, drift fences to protect sensitive plant communities).
- The "Affected Environment" and "Environmental Consequences" chapter(s) compares impacts to threatened and endangered species for the proposed action, no-action alternative, and reasonable alternatives. If there is a "may affect" conclusion it is desirable to attach the biological assessment and biological opinion to the EA or EIS.

- The "Consultation and Coordination" chapter describes the informal and formal consultation process with the Service.
- The "Environmental Commitment" chapter summarizes the measures to protect threatened and endangered species incorporated into the project.

MITIGATION AND ENVIRONMENTAL COMMITMENT PROGRAM

Although NEPA does not require mitigation, it is good practice to develop measures to mitigate adverse environmental impacts to the extent possible. Any mitigation or enhancement measures planned are termed Environmental Commitments.

The environmental commitment program assures that decisions are carried out and post-project monitoring and mitigation are implemented. Project funding is conditioned on carrying out mitigation. This may be implemented through the preparation of an environmental commitment plan which outlines the environmental commitments presented in the environmental compliance document and describes how each commitment would be implemented. Specification writers and inspectors are informed of environmental commitments so that the commitments are integrated into their work.

An environmental monitoring plan is developed and incorporated into the proposed project during planning in response to developing issues. Monitoring is designed to evaluate the success of the mitigation measures so that adjustments could be made. The results are documented in a final report and could be used in future planning and NEPA compliance for any potential future project. On request, Reclamation informs cooperating or commenting agencies on its progress in carrying out mitigation measures and makes the results of relevant monitoring available to the public.

PUBLIC INVOLVEMENT CRITERIA

This section deals with existing public information policy and practice in general. DOI may want to implement an overall public involvement program that is ongoing with different publics or with different levels of the public.

Public involvement is the process by which interested and affected individuals, organizations, agencies and governmental entities are consulted and included in decisionmaking. There is a difference between public information and public involvement—public information is to inform the public, while the purpose of public involvement is to both inform the public and solicit public response regarding the public's needs, values, and evaluation of proposed actions.

The early development of a public involvement program and plan is essential. Public involvement programs are not a single event, such as a public hearing, but a series of coordinated activities which provide different kinds of participation opportunities at different stages of a decision-making process. The public involvement plan is a dynamic document continually revised and updated during the decision-making process.

The following six steps need to be completed to develop an adequate public involvement program:

Identify the decision-making process.

Identify the public involvement objectives for each stage in the decision-making process.

Identify the information exchange which must take place with the public to complete each step in the decision-making process.

Identify the publics with whom this information must be exchanged.

Identify the unique conditions surrounding the issue and the public that could affect the selection of public involvement techniques.

Identify the techniques—and sequence of use of these techniques—to accomplish the required exchange of information with the appropriate publics.

Following the development of the public involvement program, a public involvement plan is prepared. The public involvement plan is prepared to ensure the public involvement program; is responsive to the level of interest and concern expressed by the publics; is visible and understood by the agencies, groups, and individuals who need to participate; and is carefully and systematically designed as part of the decision-making process. A public involvement plan is developed in consultation with appropriate Federal, State, and local agencies, and interested and affected individuals and groups. A public involvement plan includes:

A description of the preliminary consultation activities that led to development of the public involvement plan, including agencies, groups and individuals consulted.

An analysis of the major issues likely to be addressed in the decision-making process.

An assessment of the level of public interest likely to be generated by the action under consideration.

An identification of agencies, groups, and individuals most likely to be interested in the action under consideration.

An identification of the public involvement expertise and effort that will be needed.

A plan of sequential public involvement activities integrated with the decision-making process, including other elements as applicable, such as preparation of environmental impact documents.

The public involvement plan will also identify key review points in the decision-making process to examine the effectiveness of the public involvement plan.

SOCIAL IMPACT ANALYSIS

Social impact assessment is predicated on the notion that decision-makers should understand the consequences of their decisions before they act and that the people affected will not only be notified of the effects, but have the opportunity to design their future. The human environment has an advantage

over other parts of the natural environment because it reacts in anticipation of change, can plan for change, and can adapt in a reasoned way to changing circumstances by being part of the planning/decision-making process. In addition, persons in different social settings interpret change in different ways, which in turn affects how they react. Perhaps because of this complexity, or the political consequences of making explicit the social consequences of projects and programs, social impact assessment is sometimes not done or not well integrated into the decision-making process. However, when a social impact assessment is integrated into the decision-making process, better decisions result.

While a social impact assessment is designed and conducted for each specific action, the following (from Guidelines and Principles for Social Impact Assessment, prepared by The Interorganizational Committee on Guidelines and Principles for Social Impact Assessment, International Association for Impact Assessment) identifies key elements of social impact assessment.

DEFINITIONS

Social impacts: the consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs and generally cope as members of society. The term also includes cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society.

Social impact assessment: the effort to assess or estimate, in advance, the social consequences that are likely to follow from specific policy actions (including programs, and the adoption of new policies), and specific government actions (including building projects).

PRINCIPLES FOR SOCIAL IMPACT ASSESSMENT

Involve the diverse public: Identify and involve all potentially affected groups and individuals.

Analyze impact equity: Clearly identify who will win and who will lose and emphasize vulnerability of under-represented groups.

Focus the assessment: Address issues and public concerns that "really count," not those that are "easy to count."

Identify methods and assumptions and define significance in advance: Define how the social impact assessment was conducted, what assumptions were used and how significant impacts were selected.

Provide feedback on social impacts to project planners: Identify problems that could be solved with changes to the proposed action or alternatives.

Use social impact assessment practitioners: Trained social scientists employing social science methods will provide the best results.

Establish monitoring and mitigation programs: Manage uncertainty by monitoring and mitigating adverse impacts

Identify data sources: Published scientific literature, secondary data and primary data from the affected area.

Plan for gaps in data.

STEPS IN THE SOCIAL IMPACT ASSESSMENT

Develop a public involvement plan to involve the public and all potentially affected groups in the Social Impact Assessment process.

Describe the proposed action or policy change and reasonable alternatives if appropriate.

Describe the relevant human environment/area of influence and baseline conditions.

After obtaining a technical understanding of the proposal, identify the full range of probable social impacts that will be addressed based on discussion with all potentially affected publics.

Investigate the probable impacts.

Determine the significance of the identified social impacts.

Estimate higher-order impacts and cumulative impacts.

Recommend alternatives or changes in the proposed action and estimate/project the consequences of the proposed modifications.

Develop a mitigation plan.

Develop a monitoring program.

MATS

DOI uses the Multi-Attribute Tradeoff System (MATS). This is a tool (an interactive computer program) designed to assist planners in the evaluation of plans having impacts on many factors (e.g., a water resource development having effects on many environmental, social, and economic factors). MATS enables the user to analyze tradeoffs between multiple objectives or attributes in order to arrive at a judgment of the overall worth of a given mix of gains or losses for those attributes (e.g., an amount of environmental enhancement [gain] versus an amount of environmental degradation [loss] from a proposed project).

Impact from bureaus concerning such statutes and regulations as Outer Continental Shelf Lands Act, Superfund, etc.

CONSTRUCTION ACTIVITIES AND MANAGEMENT

As described in the discussion on the development process, construction can also be broken down into two categories—streamlined and complex projects.

Planning level designs typically consist of flow diagrams, appraisal level cost estimates, and process descriptions to meet regulatory requirements.

Feasibility level designs include a detailed review of available treatment processes which provide a treated effluent that will meet regulatory requirements and meet the clients' requirements of capital cost, O&M cost, and O&M requirements. Typical feasibility level products include feasibility level drawings consisting of plans and process flow diagrams, construction cost estimate and O&M cost estimate.

Construction level designs provide the client with a construction package of drawings and specifications that can be used to solicit bids from contractors for construction. Construction level design also consists of an Engineering Level Cost Estimate and an Engineering Report. The Engineering Report describes the design procedure and selected process descriptions that will be submitted by the client as an attachment to the application for a construction and National Pollutant Discharge Elimination System (NPDES) permit, if required.

Project construction review and oversight - Construction liaisons and field inspectors would be required for the retrofit of existing plants as well as the construction of new plants. Project oversight includes the analysis of critical path diagrams, resource management and field inspection.

Environmental commitment program following construction is a very critical factor for all projects (see Mitigation and Environmental Commitment Program, above).

OTHER EVALUATION TOOLS

VALUE ENGINEERING

ADAPTIVE MANAGEMENT

Section III

DOI BORDER ACTIVITIES, UNITED STATES-MEXICO

BUREAU OF INDIAN AFFAIRS

SECTION I - INTRODUCTION

Mission Statement

The Bureau of Indian Affair's (BIA) mission is to enhance the quality of life, to promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of American Indians, Indian tribes and Alaska Natives. We accomplish this through the delivery of quality services, maintaining government-to-government relationships within the spirit of Indian self-determination.

BIA Capabilities

The BIA has the ability to manage a complex, multi-faceted organization. Customers are the focus of our agency. Priorities are set and executed plans are consistent with our strategic objectives. Employees are an important asset and we achieve results through teamwork. Our priority is to support and enhance tribal governments. We provide quality services in a timely and professional manner and have organizational flexibility to meet the changing needs of our customers. BIA employees are committed, knowledgeable and empowered. Our policies are clear, consistent and supported throughout the organization. We foster cooperation and coordination in consultation with Indian tribes, while supporting self-determination and tribal sovereignty.

BIA Experience

The BIA is located within the U.S. Department of Interior and is the lead federal agency with primary responsibility for working with federally-recognized Indian tribal governments and Alaska Native village communities. The BIA relates its work to federal tribal governments in what is termed a government-to-government relationship. Under U.S. policy of Indian self-determination, the BIA's main goal is to support tribal efforts to govern their own reservation lands by providing them with technical assistance, as well as programs and services. This is accomplished through our headquarters in Washington, D.C., 12 Area Offices located throughout the country, 109 field agencies and special offices.

A principal BIA responsibility is administering and managing some 56.2 million acres of land (including approximately 100 miles of reservation lands along the U.S./Mexico border) which are held in trust by the United States for Indians. The development of forested areas, leasing and protecting mineral, water and/or land rights, directing and funding agricultural programs, and protecting natural resources are all a part of this responsibility in cooperation with the tribes, who have a greater decision-making role in these matters now than in the past.

Another part of the BIA's work is to also assist tribes with local governmental services such as road construction and maintenance, housing and social services programs, law enforcement protection, economic development opportunities, educational programs and facilities, and enhancement of governance and administrative skills.

The BIA was established in 1824 in the War Department. It became an agency of the Department of the Interior when the Department was created in 1849. Until 1980, the BIA was headed by a Commissioner who by law was a presidential appointee requiring confirmation by the U.S. Senate. From 1980 to 1994 the BIA has been administered by an Assistant Secretary-Indian Affairs (or a Deputy Commissioner post) which was created in 1977 by the Interior Secretary.

Approximately 87 percent of BIA employees are Indian through Indian preference in hiring. Under federal law, a non-Indian applicant cannot be hired for a vacancy if a qualified Indian has applied for the position. To qualify for preference status, a person must be a member of a federally-recognized Indian tribe or be of at least one-half Indian blood of tribes indigenous to the United States.

Under the Indian self-determination policy, tribes may operate their own reservation programs by either contracting with the BIA for federal appropriations or through a pilot program called self governance compacts where federal funds go directly to tribal governments to run their own affairs.

BIA Border Projects

The BIA acts as either a lead or cooperative Federal agency in activities/actions that involve Indian trust lands under the regulations for compliance with National Environmental Policy Act (NEPA) and other related environmental requirements.

We provide technical assistance and funds for development and government operations by Indian tribes and individuals in areas such as: the south reservation cattle fence on the Papago Reservation in Arizona adjacent to the U.S./Mexico border; the closure of open dump sites and old landfills or the development of new landfill sites; hazardous waste clean-up operations; and stock water projects, to name a few.

Currently, four BIA Area Offices oversee Indian trust lands adjacent to the U.S./Mexico border (i.e. Anadarko, Albuquerque, Phoenix and Sacramento Area Offices).

Serving BECC and its Clients

The BIA serves as the agency trust officer for Indian reservations. We provide a means of coordination, communication, and connection with tribal governments to other parties. As the primary agency for the Secretary of the Interior in execution of the trust responsibilities of the United States vis-a-vis Indian affairs, the BIA can serve BECC in:

- Relating proposed actions to the trust responsibilities of the United States to Indian tribes' and individuals' rights.
- Identifying impinging factors in the regulatory environment.
- Facilitating project sponsors' cooperation with existing governmental organizations.
- Providing source of early information on projects which may fall within BECC's purview.

BUREAU OF LAND MANAGEMENT

BLM MISSION

The Bureau of Land Management (BLM) administers public lands within a framework of numerous laws. The most comprehensive of these is the Federal Land Policy and Management Act of 1976 (FLPMA). All BLM policies, procedures and management actions will be consistent with FLPMA and the other laws that govern use of the public lands.

It is the mission of the BLM to sustain the health, diversity and productivity of the public lands for the use and enjoyment of present and future generations.

BLM ACTIVITIES IN THE BORDER REGION

In managing the public lands, BLM performs a wide variety of functions including, but not limited to, taking inventory of resources; preparing land use plans and assessing environmental impacts; conducting land surveys; issuing leases and other use authorizations; enforcing permit conditions; designing and constructing roads and other improvements; managing fish and wildlife habitat; identifying and protecting significant natural, cultural and recreational resources; and monitoring resource conditions. In addition, BLM maintains the original property and cadastral survey records of the United States. All of these activities are conducted with extensive public participation and in coordination with other federal agencies; state, tribal, and local governments; and other affected interests.

BLM administers 2.8 million hectares (6.9 million acres) of public land located in California, Arizona and New Mexico, within 100 kilometers (62 miles) of the United States/Mexico border (the border region).

Threatened and endangered species management and recovery plans are of high interest in all three states. BLM manages a large area of habitat of threatened and endangered species and for species of special concern. There are 11 listed animal species along the California, Arizona and New Mexico border on BLM lands. There are five listed plant species and 54 additional animal and plant species being considered for listing.

All three states have special areas with significant visual resource values that interest the public. They include the New River in California, the San Pedro Riparian National Conservation Area in Arizona, and the Aden Lava Flow Research Natural Area and the Organ Franklin Mountains Area of Critical Environmental Concern in New Mexico.

Public lands within the border region are used for mining, oil and gas leasing, grazing, hiking, hunting, wildlife, roads, bridges, railroads, utilities, communication sites, sanitary land fills and other diverse purposes.

Additional pressures are expected to be placed on these lands to achieve expanded trade envisioned under the North American Free Trade Agreement (NAFTA). For example, new and expanded border crossings and other infrastructure are expected. This will increase commerce and the potential for spills of hazardous materials. Also, the demand for sand and gravel is expected to increase to support additional infrastructure, such as roads.

Telephone, radio and data communication needs also will increase. BLM has 26 communication sites within the border region on public land. Five are in California, six are in Arizona and 15 sites are in New Mexico.

BLM has administrative jurisdiction to authorize activities pursuant to the Presidential Proclamation of May 27, 1907, over a 60-foot wide strip of land along the international boundary in California, Arizona and New Mexico. This includes all lands along the border patented to individuals after May 27, 1907, and those lands withdrawn after 1907 for specific purposes, such as Indian Reservations, National Parks, and National Wildlife Refuges. The purpose of the Presidential Proclamation was to make sure this strip is kept free from obstruction as a protection against the smuggling of goods between the United States and Mexico. As stated in the proclamation, the strip of land "may be used for public highways but for no other purpose whatever."

BLM in California administers 9 newly established wilderness areas, totalling 95,000 hectares (235,000 acres), and 4 wilderness study areas of approximately 8,100 hectares (20,000 acres) within the border region. BLM in Arizona manages 5 wilderness areas and one wilderness study area totalling more than 25,000 hectares (62,000 acres). New Mexico manages 13 wilderness study areas, totalling 147,000 hectares (364,000 acres), seven of which are recommended suitable for wilderness designation by BLM. The other six are classified as Areas of Critical Environmental Concern.

The San Pedro Riparian National Conservation Area was designated by the United States Congress in 1988. This 23,000-hectare (56,000-acre) strip of land begins at the Mexico border and traverses both sides of the San Pedro River for about 58 kilometers (36 miles) north to Saint David, Arizona. The headwaters of the 250-kilometer (155-mile) long river are located near Cananea, Sonora, Mexico, about 48 kilometers (30 miles) south of the international border. The total watershed area of the San Pedro River is 11,611 square kilometers (4,483 square miles), 1,802 square kilometers (696 square miles--16 percent) of which are in Mexico. The benefits of integrating data and expertise to jointly address specific concerns accrue to both nations. BLM is leading an effort to demonstrate ecosystem management at an international level.

BLM and the Department of Defense jointly manage 1.8 million acres of the Barry M. Goldwater Air Force Range. BLM is responsible for natural resource management on the Range while the Department of Defense has responsibility for military activities. The Range is the premier fighter training locale in the western United States while being a valuable repository of significant natural and cultural resource values, special status wildlife and plant species, and recreational opportunities.

Additionally, BLM manages 55 Areas of Critical Environmental Concern (ACECs) in the border region of the three states totalling more than 223,000 hectares (552,000 acres).

SERVING BECC AND ITS CLIENTS

- BLM can provide guidance and assistance to interagency and intergovernmental planning and National Environmental Policy Act (NEPA) compliance efforts.

- BLM can provide information regarding public land records and cadastral surveys.

- Where consistent with land use planning and applicable laws, BLM can sell or make land available for a variety of public purposes, including schools, municipal buildings, sanitary land fills, waste water treatment plants, etc.

- BLM can authorize appropriate uses within a 60-foot wide reservation along the border.
- The BLM National Training Center can provide a variety of training in natural resource management, planning and NEPA compliance.
- BLM can provide expertise in hydrology, geology, lands and realty, hazardous materials cleanup, emergency response, law enforcement, and other disciplines.

SUMMARY OF BLM EXPERTISE

- BLM has considerable expertise in interagency and intergovernmental cooperation and planning in multiple use resource management, including ecosystem planning, long-range planning, and land use planning focused on a wide variety of resources.
- BLM has had 60 years of experience working at the local level, encouraging public participation in natural resource management. It is BLM's way of doing business.
- The BLM National Training Center, located in Phoenix, Arizona, is the focal point for ensuring that the BLM workforce has the skills and knowledge to meet the challenges of the future. It not only provides training for the more traditional, specialized knowledge and skills needed by a workforce for tomorrow, but it stresses the importance of ecosystem management, public service, work force diversity, intergovernmental collaboration, and sound management practices.
- BLM has exclusive authority to make original land (cadastral) surveys and to issue patents to public lands. It also is responsible for making resurveys.
- BLM is responsible for preserving and updating the public land and mineral records regarding survey, title and land use. BLM records provide land and mineral status, and show land availability and opportunities for the public and industry to use the public lands for a variety of purposes.
- BLM has expertise in land use authorizations and rights-of-way, including NEPA compliance for border crossings and use authorizations for recreation and other public purposes.
- BLM has expertise in the adjudication of locatable and leasable minerals under FLPMA and the general mining and mineral leasing laws.
- BLM has well-trained hydrologists and geologists with years of on-the-ground experience.
- BLM arranges for emergency removal and cleanup of hazardous material sites on public land. Sites are usually identified by an inventory that ranks their potential for human health risks. Future risks and liabilities are reduced by aggressively identifying, stabilizing and cleaning up contaminated sites. People making unlawful disposals or using illegal processes involving hazardous materials on public land are prosecuted. Hazardous materials specialists minimize current risks by assuring compliance with applicable state and federal laws, and working closely with other BLM programs that involve hazardous materials.

EXAMPLES OF PROJECTS

California

BLM is the lead for ecosystem management plans for:

(1) Northern and eastern Colorado Desert. This ecosystem includes the Southeastern California Desert, Colorado and Mojave Desert bioregions and covers 2.2 million hectares (5.5 million acres). Cooperators include: U.S. Fish and Wildlife Service, Border Patrol, Riverside and Imperial counties, and three subregional associations of government. It includes habitat for the threatened desert tortoise and about 30 special status plants.

(2) Western Colorado Desert. This is in an area which extends to the border with Mexico, which focuses on management of habitat for the flat-tailed horned lizard (proposed for listing). Habitat for the species extends into Mexico.

(3) Multi-agency Plan to Recover the Peninsular Bighorn Sheep Metapopulation. This plan covers the Santa Rosa Mountains south and extends into Baja California. The metapopulation has been proposed for listing as endangered.

The BLM is participating with local governments in other plans, such as:

(1) Natural Communities Conservation Plan. This is an ecosystem management plan under the leadership of San Diego County. BLM expects to support the Natural Communities Conservation Plan by acquiring lands in Southern California Coastal Sage Scrub habitat in the Otay Mountain/Kuchumaa Acquisition Project.

(2) Other multi-species, multi-habitat planning projects in San Diego County.

North County Multiple Habitat Conservation Plan
Multiple Habitat Conservation/open Space Program
Multi-species Conservation Program

(3) Coachella Valley Habitat Conservation Plan, in cooperation with the Coachella Valley Association of Governments. The plan deals with habitat for the fringe-toed lizard, as well as other species.

Arizona

BLM is an active participant in the State's adjudication of water rights in the Gila River system, particularly the San Pedro River Basin.

BLM is the lead for ecosystem management plans for the:

(1) Empire-Cienega Ecosystem Management Area. This includes about 20,000 hectares (50,000 acres) of federal and private land near Sonoita, Arizona. The area has lush grasslands, oak woodlands, and extensive perennial stream and marsh habitats that support diverse populations of game and nongame animals and native fish (including three endangered species). The heritage of Native Americans dates back at least 5,000 years. Evidence of early Spanish settlers and the later ranching interests are also present.

(2) San Pedro River Basin Management Area. A collaborative process is being used to obtain the overall management objective of maintaining the Basin's natural functions and guaranteeing instream flows to sustain migratory pathways and breeding habitat for the great diversity of fauna which depend upon the area. Other important objectives are to preserve, maintain and interpret a myriad of cultural sites and to provide unique recreational and educational opportunities in the Nation's foremost desert riparian ecosystem.

Centro Ecológico de Sonora and others in Mexico also have a significant interest in the San Pedro River Basin and are working with BLM to conserve the Basin's valuable natural resources.

(3) Santa Cruz River Basin Management Unit. This area encompasses about 61,000 hectares (150,000 acres) of public land between Nogales and Phoenix, Arizona, along the Interstate 17 and Interstate 10 corridors. These lower desert ecosystems provide important habitat for various sensitive plant and animal species such as desert bighorn sheep, Sonoran desert tortoise, and Nichol Turk's Head cactus. They also contain highly significant cultural and scenic values.

BLM is an active charter member of Partners in Flight - Aves de Las Americas, an international program to conserve neotropical migratory birds.

The International Sonoran Desert Alliance is a public-private partnership composed of residents, business leaders, state and federal resource managers, and conservationists from the United States, Mexico and the O'odham Nation. This nonprofit organization works to identify and carry out activities appropriate for the western Sonoran desert region that ensure respect for cultural heritage, provide economic opportunities for rural communities, and protect the biologically significant resources present. BLM actively participates in an advisory capacity to the Alliance.

BLM is a member of the Sonoran Pronghorn Antelope Core Group, an international team established to implement the recovery plan for this endangered species. Other members of the Core Group include the U.S. Fish and Wildlife Service, National Park Service, Arizona Game and Fish Department, Tohono O'odham Nation and Centro Ecológico de Sonora.

BLM works with the Arizona Game and Fish Department and the Arizona desert Bighorn Sheep Society to promote desert bighorn sheep population growth and maintenance, through cooperatively developing water sources for the bighorns.

BLM works closely with Native Americans in the border area to assure its management actions are in concert with the religious concerns of the various tribes.

The Lower Gila Resource Area is in the process of updating its land use plans for the borderlands region in response to new environmental concerns, growing recreational demands, expanding communities, and new partnerships with our federal, state, local and Native American Tribal neighbors.

BLM is a participant in the Southern Arizona Federal Clean Air Partnership which provides a forum from which to coordinate land manager's efforts in protecting air quality and related values on federal lands in Southern Arizona.

BLM in Arizona and California, as well as other federal and state agencies are developing a rangewide plan for managing the flat-tailed horned lizard, a species currently proposed for listing as threatened under the Endangered Species Act.

New Mexico

A significant portion of BLM's work in New Mexico within the border region involves lands and realty projects. These include:

- Authorizing construction of the High Mesa Road from the interchange on Interstate 10 at the Las Cruces Airport south for about 35 miles along the west mesa to near the airport at Santa Teresa, New Mexico.
- An inter-modal site just west of the Santa Teresa airport.
- Expansion of the Santa Teresa airport to move smaller planes from El Paso International and to increase capability for the commercial transportation of goods.
- Road upgrading (paving) from Anapra to Columbus along the old railroad bed to move goods.
- Right-of-way to the new Regional Dona Ana County Landfill.
- Dona Ana County training school at the Santa Teresa airport inter-modal site.
- Environmental Impact Statement for a 345 kV line from Newman substation north of El Paso through Anthony Gap between the Dona Ana Mountains and the Franklin Mountains across Interstate 25, the Rio Grande River to the Port of Entry Substation in southwestern New Mexico in Santa Teresa. This is to serve future commercial and industrial development in the United States and those sites to be developed just across the border in Mexico.
- There is potential for a large natural gas pipeline to the inter-modal site west of the Santa Teresa airport and possibly into Mexico to serve development at the site on the Mexico side of the border.
- An individual has signed an agreement with Dona Ana County to supply water to its proposed water treatment plant, should it be built on the airport grounds. Numerous wells could be drilled and 1,000 acre feet of water could be pumped from BLM lands if the state of New Mexico grants the individual the rights to the water. However, the water treatment plant is not in compliance with the airport patent.

Starr and Zapata County Oil and Gas Development on the Texas Border. In Falcon State Park on federally owned minerals, three companies propose drilling their existing oil and gas leases and are seeking approval of their 56 Applications for Permits to Drill. Environmental Assessments are being prepared. BLM is working closely with the International Boundary and Water Commission, U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, and the interested publics.

An Application for Permits to Drill has been filed for development of Federal minerals under Santa Ana National Wildlife Refuge within Hildalgo County Texas by Texas Independent Exploration Inc. The proposed off-site development pad will be located in a sugar cane field known to provide habitat for endangered cats. This involves the International Boundary and Water Commission, U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department and surface owners.

POINTS OF CONTACT

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BUREAU OF MINES

MISSION

The mission of the U.S. Bureau of Mines is to help ensure that the Nation has an adequate and dependable supply of fuel and nonfuel minerals to meet its defense and economic needs by conducting research aimed at minimizing the environmental, health, and safety costs of mineral extraction and processing; acquiring and analyzing domestic and international minerals data; and engaging in activities to advance minerals and materials science.

BORDER PROJECTS AND AREAS OF COOPERATION WITH THE BECC AND ITS CLIENTS

The following highlights ongoing USBM environmental technology capabilities and current regulatory analysis and mineral land assessment programs which address the evaluation of the impacts of past, present, and future mineral-related land use planning decisions in the United States/Mexico border areas. Many of these current projects are being done for or in cooperation with the National Park Service, the Bureau of Land Management, the U.S. Forest Service, or the U.S. Environmental Protection Agency.

CURRENT USBM MINERAL LAND/ECOLOGICAL/ENVIRONMENTAL PROJECTS

United States/Mexico Border projects and initiatives:

- Coronado National Forest mineral appraisal and abandoned mine site inventory and prioritization in cooperation with the United States Forest Service.
- Socioeconomic impact study of the West Mojave - in cooperation with BLM.
- Mineral resource evaluation, analysis of areas of critical environmental concern, reasonable foreseeable development scenarios in Caballo Resource Area - in cooperation with BLM and USGS.
- Definition and analysis of "Known Mineral Deposit Areas" (sic: mineral habitats) in Arizona, New Mexico, and California - for use in ecosystems analysis, evaluation of sustainable development, and identification of areas of land-use conflicts - information is available in GIS format for immediate integration.
- Mineral appraisal, analysis of impact of recreational gold panning on riparian zones, inventory of inactive and abandoned mine sites, site characterization, analysis of reasonable foreseeable mineral development, and economic-environmental analysis of a potential remaining opportunity in the Prescott National Forest-in cooperation with the Arizona Department of Environmental Quality and the United States Forest Service.
- Analysis of effluents from the Cananea copper smelter in Sonora, Mexico.

United States/Canada Border projects and initiatives:

- Voyageurs National Park minerals - environmental analysis of impacts on promulgated Minnesota revised mineral leasing regulation and potential impacts on the Park and surrounding ecosystem - in cooperation with NPS and the State of Minnesota.
- Economic analysis of mineral impacts to Spotted Owl Critical Habitats.
- Geologic, geochemical, and geophysical characterization of abandoned mine and mill sites in Moon Gulch in Coeur d'Alene drainage basin—cooperation with Idaho Department of Environmental Quality and EPA.
- Bureau of Mines Abandoned Mine Land Inventory and Hazard Evaluation Handbook. This benchmark publication is available for use by all the State and Federal researchers involved in the environmental assessment of abandoned mine lands.
- Assisted DOI in reviewing mining and environmental impact regulations related to Windy Craggy copper deposit in British Columbia and its potential impact on adjoining Alaska territory.

USBM ENVIRONMENTAL TECHNOLOGY CAPABILITIES

- **Pollution prevention techniques and strategies**

The USBM has developed pollution prevention technologies and strategies for water and solid waste through its research program for mining that have application to any similar areas in Canada and Mexico. Perhaps more importantly, they have technology transfer potential to other industries. An example is the utilization of technology for the extraction of precious metals from ores. This technology is now being used to recover platinum and rhodium (essential components in automobile catalytic converters) from scrap units. This reduces the requirement for virgin materials and results in less materials having to be disposed of in landfills.

- **Scientific research and technology development in respect of environmental matters**

The USBM has a significant research program related to environmental matters. The focus of this program is the development of waste remediation technologies. Although the justification of the program has been for mining and mineral processing waste cleanup, there are many examples of these technologies being transferred to nonmining applications. An early example is lead decontamination of soils at sites that recycle automobile batteries utilizing USBM metallurgical techniques. A recent example is the treatment of contaminated sediments in the Chicago River.

- **Environmental emergency preparedness and response activities**

The USBM has some unique capabilities in the area of emergency preparedness and response, particularly with regard to natural disasters. Because of the expertise of the USBM staff, we are capable of responding to such events as land subsidence, fires, earthquakes, floods, landslides and hurricanes. The USBM is frequently contacted by public officials to address these types of emergency issues. Immediately after the devastating September 19-20, 1985 earthquake in Mexico City, where buildings collapsed and people were trapped, the USBM participated in rescue efforts utilizing specialized drilling and monitoring equipment developed for the mining industry to drill through building floors. A borehole television camera with lights and sound sensors was then utilized to locate victims and hence direct rescue efforts.

- **The exchange of environmental scientists and officials**

Mining and mineral processing are proportionally more important parts of the Canadian and Mexican economies than they are in the United States The Bureau's Research staff include many world-class scientists and engineers who could participate in cooperative exchange and research programs which address common environmental issues.

- **Approaches to environmental compliance and enforcement**

A major part of the USBM's environmental research program is focused on the development of technologies which will allow for mining and mineral processing, which is so necessary to our economy, and at the same time do so within the established environmental controls required by environmental laws and regulations. The expertise of the Bureau of Mines scientists and engineers could be made available for cooperative programs in this area.

BUREAU OF RECLAMATION

MISSION

The mission of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

SERVING BECC AND ITS CLIENTS

Because of extensive experience with multidisciplinary teams in a wide variety of environments, Reclamation can tailor management plans and training to meet local needs. Reclamation frequently cooperates with and assists other agencies to provide basin management, ecosystem management, environmental assessments, and water conservation and allocation. These collaborative efforts focus on providing and transferring technology and expertise to local resource management groups to ensure implementation of sustainable solutions to water resource management problems. Specific examples follow which demonstrate how Reclamation can serve resource managers in the planning, implementation, and evaluation processes.

- Reclamation has extensive experience in conducting environmental impact assessments relating particularly to projects of keen public interest. Reclamation applies NEPA to all projects it undertakes in the United States, and when appropriate, conducts environmental studies, including evaluation of the impacts of development and resource use on ecological resources; public involvement meetings; EA/EIS scoping; and data collection. Assessments of this type would likely be useful in evaluating potential BECC projects.

- Readily accessible baseline data are needed to make informed decisions. Reclamation can provide baseline data on water quantity and quality, instream flows, water supply and demands, fish and wildlife, and wetlands. Reclamation designs and compiles tabular and graphic spatial databases using existing maps, aerial photography, airborne videography, satellite imagery, and global positioning systems. A short list of applications for Remote Sensing and GIS include resource inventories, lake limnology, endangered fish habitat studies, water spreading, and environmental change detection.

- Reclamation plans and executes hazardous waste site removal actions, reviews remedial designs by consultants, conducts remedial investigations and feasibility studies, and has provided on-site hazardous waste remediation assistance to EPA, DOE, and USGS.

- Reclamation designs water treatment systems to produce potable water, treat domestic wastewater, and remove hazardous chemicals and other constituents from contaminated water; reviews private industry designs and specifications and provides project management and construction support for water and wastewater treatment systems; evaluates and retrofits existing water and wastewater treatment systems; conducts operation and maintenance workshops; and provides design assistance on water and wastewater treatment projects.

- Reclamation is a world leader in the design, construction, and operation of water resource related infrastructure, including water storage and conveyance facilities, powerplants, switchyards and substations, buildings, roads, bridges, and artificial wetlands. Reclamation also provides structural analyses, evaluations of and modifications to existing structures, training in the operation and maintenance of facilities, and design assistance on water and wastewater treatment projects.

- Reclamation recognizes the importance of determining the proper allocation of water among competing uses. Reclamation's experience is an invaluable asset in developing and evaluating proposals for water resource applications, including the integration of ecological, hydrological, geological, social, political, and environmental investigations.

- To measure and facilitate the effectiveness of water and wastewater management projects, Reclamation can design water quality sampling and quality assurance programs. Reclamation has developed, implemented, and maintained complex water quality models for rivers, reservoirs, and ground water.

SUMMARY OF EXPERTISE

- Managing small and large complex problem identification and resolution studies ranging from broad-based river basin studies to studies leading to construction.

- Developing and managing integrated water delivery systems including rivers, reservoirs, and irrigation systems; hydrologic forecasting; flood control; developing probable maximum floods and inflow design hydrographs for reservoirs; probable maximum precipitation and design storm studies; flood frequency and cross-drainage studies; designing early warning systems (EWS); statistical and stochastic hydrology analyses; developing drought indices; and conducting hydrometeorology and hydrology research.

- Developing ground water investigation programs, performing field investigations for a wide variety of ground water-related problems, evaluating conjunctive use opportunities of ground water and surface water, and determining safe yield for groundwater basins.

- Conducting aquifer tests, complex analyses of groundwater flow and contaminant transport using modeling techniques; well head protection studies; remediating for contaminated ground-water systems and analyzing data to evaluate aquifer characteristics, including groundwater recharge potential; assisting in investigations and design of complex dewatering systems; constructing, operating, and maintaining subsurface drainage systems.

- Conducting assessments of water and wastewater treatment needs with regard to existing or new facilities and assisting as needed with design, design review, and construction management of new facilities or modifications to existing facilities.

- Conserving water through canal automation, developing efficient water measurement and field evaluation methods, modeling groundwater and drainage, and researching water management.

- Evaluating fish, waterfowl, and raptor habitats, limnology, and desert and coastal ecosystems; restoring aquatic habitat; enhancing and creating wetlands and riparian habitat; GIS—based wildlife management modeling; instream flow studies; preparing environmental impact reports and resource management plans; scoping, public involvement, data collection, and compliance with laws and regulations.

- Conducting environmental studies and applied research in such areas as hazardous waste cleanup, aquatic ecology, water quality, aquatic plant management, aquatic pest control, fate and transformation of toxic elements, behavior of nitrate and selenium, interpretation of water quality data, and wetlands restoration.

- Researching, laboratory testing, designing, and installing water treatment and desalting plants, pretreatment systems, brine disposal systems, solar ponds, and solar-powered pumping and desalting systems; assisting communities in selecting water treatment methods, including mobile water treatment plants.

- Investigating hazardous and toxic substances in soil and water, wetlands, and riparian habitat and testing for sedimentation and erosion.

- Analyzing economic justification, economic impacts, and financial feasibility, including determining recreation use benefits; applying economic models to estimate impacts in environmental impact statements; computing the ability-to-pay of prospective rural water users; determining the value of environmental resources, such as wetlands and endangered species; economically evaluating actions affecting Native Americans; and decisionmaking for the Safety of Dams Program.

- Developing and evaluating dam safety tools including emergency spillways and dam overtopping protection.

- Identifying and analyzing existing and potential social issues and impacts of government actions and communicating the results to decision makers and affected publics; managing conflict; evaluating Indian Trust Assets; and preparing, implementing, and documenting public involvement plans.

- Identifying, documenting, and evaluating cultural resources; mitigating impacts; and assisting in curation.

- Providing technical assistance for outdoor recreation and concession management, land use agreements, law enforcement advice, and legislative assistance.

- Providing cost-effective geotechnical studies and analyses; geologic consulting; site-specific and regional earthquake hazard; engineering, geophysical, and paleoflood investigations; risk analysis; mapping; subsurface exploring and sampling; three-dimensional modeling; analysis of hazardous and toxic waste characteristics; rock mechanics analysis; seepage studies; water basin studies; and determining dewatering system requirements.

- Promoting value engineering and value analysis to ensure realistic budgets and identify nonessential capital and operating costs.
- HYDROSS is a surface water supply model developed by Reclamation to assist in planning studies for evaluating existing and proposed demands on a river system. HYDROSS operates over a discrete period of record, simulating the effects of factitious development on historical pristine flows. The X windowing system was used to develop the GUI which includes an interactive network builder to schematically define a river network for calibrating, verifying, and interpreting model results. The Ingres relational database management system was used to manage a hierarchical scenario database for further analysis and comparison.

EXAMPLES OF PROJECTS

Yuma Desalting Plant

Using reverse osmosis technology, the Yuma Desalting Plant can desalt brackish water to produce up to 73 million gallons of potable water per day. The plant takes in water from an irrigation drainage canal, and pretreats the water by grit removal, sedimentation, softening and clarification, filtration and pH reduction. Fourteen high-pressure pumps then force the water (which is under about 400 pounds per square inch) into the desalting process area. There, reverse osmosis membrane elements remove the salt from the water. Desalted water is discharged into a small canal that carries it to the Colorado River. Concentrate, or reject water, is discharged into the Bypass Drain and flows to the Santa Clara Marsh (Cienega de Santa Clara) in Mexico along with any untreated feed water.

A smaller version of the Yuma Desalting Plant exists in the form of the Test Plant. Fully functional, the Test Plant can desalt up to one million gallons of water per day. It contains the same components as the production plant: however, the Test Plant is a research and development tool, with extra instrumentation and the ability to change processes and equipment as various tests occur.

In addition, the Yuma Desalting Plant supports a state-of-the-art water laboratory. Automation and an experienced staff enable the Yuma Area Office's Water Lab to process as many as 10,000 samples annually and to perform tests on a variety of water types from fresh to salt water. Typically the lab has scored in the top 20 percent of United States labs, as rated by the U.S. Geological Survey's Proficiency Evaluation. The lab is licensed by the State of Arizona to test for major inorganics; it also tests for most trace metals. The lab follows EPA quality-control procedures. The lab provides full support to field analysis. Typical water quality equipment is included in the lab, such as inductively coupled plasma, automated analyzers, and auto diluters.

The Yuma Desalting Plant engineers have faced challenges in operating the pretreatment processes, in reducing membrane fouling, preventing membrane degradation, operating and storing the reverse osmosis elements, and disposing of the pretreatment solid wastes. Because these problems (or challenges) continue to exist throughout the reverse osmosis industry, Reclamation research programs, while designed to meet Reclamation needs, have also supplied engineering options for the reverse osmosis desalting industry in general. The Yuma Desalting Plant research has had a troubleshooting urgency that has met the short-term goals of operating an installed plant and has supplied results subject to immediate scrutiny and use.

Water Treatment Technology Program (WTTP)

Reclamation began a 7-year, $14 million Water Treatment Technology Program (WTTP) in 1992. In cooperation with private industry, universities, and local communities, Reclamation is addressing a broad range of desalting and water treatment research needs through the WTTP. The primary objective of the program is to reduce desalting and water treatment costs to promote application of these technologies to water supplies which are currently economically unfeasible to treat. Therefore, the WTTP will endeavor to increase the usable water in the United States.

One task within the WTTP is focused on small community water treatment systems. This task will develop new inexpensive technologies that are easy to install and maintain, and that require little energy or pretreatment for small communities and Native American settlements.

Reclamation has designed and is currently operating a trailer equipped with interchangeable, skid-mounted, water treatment units. Each unit is capable of interconnecting with other units to allow different treatment process trains to be tested for removing various water contaminants. This equipment is mobile and can be operated at remote sites to assist small communities in determining the best water treatment method to meet the EPA Safe Drinking Water Act standards.

EMWD Wetlands - Water Re-use (ground-water restoration, recharge, and recovery)

The Multipurpose Wetlands Project with Eastern Municipal Water District (EMWD) and Reclamation studied how secondary treated water from the Hemet/San Jacinto Regional Water Reclamation Facility can receive additional tertiary treatment by the means of a constructed, multipurpose wetlands system. A major goal of this research and demonstration project is to observe how wildlife and wetlands plants interact in a constructed wetlands environment and to learn how various components of the wetlands ecosystem affect other parts of the system. The reject flow from a Reclamation-designed, 4.5-gallon-per-minute reverse osmosis desalting plant also provides water for the wetlands project.

This research was directed toward determining how limited water resources and a wildlife environment can be enhanced through the construction of a multipurpose wetlands.

FISH AND WILDLIFE SERVICE

MISSION

The Service plays an important role in federally sponsored or permitted water resource development activities, including water resources development and other types of projects likely to be proposed to the BECC. The Service has a broad mandate to conserve fish and wildlife resources associated with such projects, from the Endangered Species Act (Act), National Environmental Policy Act (NEPA), Clear Water Act, Fish and Wildlife Coordination Act, Migratory Bird Treaty Act, and other authorities.

The Service has international mandates under such laws and treaties as the Migratory Bird Treaty Act of 1918, the North American Wetlands Conservation Act, and the international agreements under the Endangered Species Act, CITES—The Convention on International Trade in Endangered Species of Wild Fauna and Flora, and Section 8 of the Act dealing with international cooperation and endangered species conservation.

ACTIVITIES IN THE BORDER REGION

The Service has a long and successful history of cooperation in fish and wildlife conservation with our Mexican counterparts in the border region, and this cooperation will grow with the NAFTA. Service concern for and proactive planning for NAFTA in the early 1990's led to two milestone actions building upon its working relationship with Mexico. First, the Service developed a draft United States-MEXICO Border Action Plan and NAFTA Team; and second, the Service sponsored the first DOI United States-MEXICO Border Environmental Issues Conference in November 1993, in Albuquerque, New Mexico. An action taken by DOI bureau participants that was a direct result of that conference was to create the DOI United States-MEXICO Border Environmental Issues Field Coordinating Committee (DOI Field Committee), with Service serving as one of three cochairs.

The long history of Service cooperation in fish and wildlife conservation and management with its Mexican counterparts dates back to the United States-Mexico Migratory Bird Treaty in 1936 and the Western Hemisphere Convention signed in 1940. Since 1974, agencies in both countries have implemented a comprehensive program of cooperation and conservation through the Joint Committee on Wildlife and Plant Conservation. Conservation projects in the fields of training, protected areas management, endangered species, and migratory birds have been implemented throughout Mexico. The Tripartite Agreement for the Conservation of Wetlands and Their Migratory Birds has similarly generated projects with Mexico since 1988.

Mexico and the United States share a great wealth of natural resources and people along their 2,000 mile border. This thin political ribbon overlies an equally rich diversity of landscapes and cultures. Within this area, some of North America's most pristine ecosystems contrast with some of its fastest-growing urban areas. Today, almost 10 million people call the border region home. This is a tenfold increase in the past 60 years and the number will double in only 20 years. The border has become a meeting place of peoples, traditions, and futures, as well as a place where there is a dynamic ecological merging of North America's fish, wildlife, and plant communities.

On our border, the Rocky Mountains meet the Sierra Madres. Desert basins drop below the mountains and drain isolated "sky islands." Neotropical plant communities merge with desert scrub and montane woodlands. Cienegas and bolsons capture basin and spring water while riparian communities survive

along rivers that drain to coastal estuaries. An amazing abundance and diversity of wildlife—migratory and resident species—can be found here. And all these features depend on a limited supply of water which is also needed by a growing human population.

The United States-Mexico border region hosts over 490 species of flora and fauna listed as endangered or threatened or proposed for listing. In addition, border ecosystems support more than 450 rare or peripheral species. More than 200 neotropical migratory species (birds, mammals, and insects such as the monarch butterfly) use these diverse habitats during their spring and fall migrations. Some breed in these ecosystems and many are considered rare or endangered.

The region contains internationally significant wetland resources reaching from Texas and Tamaulipas to California and Baja California del Norte. (Shared watersheds of the United States and Mexico are listed in Appendix 1). More than 50 important wetland systems that lie along the border have been identified by Mexico. In addition, three joint ventures under the North American Waterfowl Management Plan support species in the border regions. Future international joint ventures may focus on southwestern riparian wetlands, a valuable shared ecosystem.

Recent passage of NAFTA represents formal recognition of the United States-Mexico region's importance to both countries and an acknowledgement of its unique natural resources. NAFTA-related development has affected and will continue to impact the border resources we share. Infrastructure and resource demands are already occurring and will continue to accumulate—international construction, the maquiladora industry, colonias, and the use of pesticides and other contaminants are all increasing.

Service and Mexico counterpart concerns and cooperation have led toward managing shared border water resources, watersheds and river basins, and ecosystems that support diverse fish and wildlife resources and sustainable natural resources. Examples of management initiatives include:

- Partners in Flight - Aves de Las Americas. The international program for conservation of neotropical migratory birds—includes public outreach and multiple partnerships. Service and Mexico established an Aves de Las Americas/Service liaison in Mexico in 1993.

- North American Waterfowl Management Plan (NAWMP). International program for wetland conservation in Mexico and the southwestern United States is one focus under the North American Wetlands Conservation Act—includes public outreach and multiple partnerships.

- RESERVA - Latin American Reserve Manager Training Program. Initiated in 1989 by the Service's Office of International Affairs, this 90-day, Mexico-based course, effected biannually, exposes wildland managers and related employees to the contemporary skills needed for the efficient management of protected areas in the neotropics.

  RESERVA is conducted from Ducks Unlimited de Mexico (DUMAC) field stations in the States of Nuevo Leon and Yucatan. Courses are conducted in Spanish by highly respected Mexican nationals who are considered experts in their field by the natural resources community. Participants are solicited from throughout Latin America and are permanently employed in the protected area management field at the time of selection. Each course is limited to no more than nine enrollees. RESERVA has included a number of Mexican participants, all SEDESOL employees.

- The Exchange Program for Latin American Protected Area Managers. This southern California based Service effort, under the auspices of the Hopper Mountain National Wildlife Refuge, provides protected area professionals from Latin America with hands-on working experience at various natural resource projects in the southern California area. In addition, via extensive interaction with participants, the Exchange Program helps Service and other agency employees garner an international perspective on environmental issues.

- United States-Mexico Tijuana River Watershed Project. This effort, spearheaded by NOAA with Service support on the project's oversight committee, includes development of a GIS for the Tijuana watershed, implementation of bilingual outreach/environmental education initiatives, and planning actions relative to Biosphere Reserve designation.

- Coordination efforts with Mexico are increasing significantly in concert with the aggressive implementation of ecosystem-based management. The Service's four United States-Mexico border ecoregion teams have identified as a priority action item the need to enhance working ties with Mexican counterparts. A number of strategies are being proposed, including employee exchange opportunities and establishment of binational working groups, especially in the lower Rio Grande/Rio Bravo del Norte area, the Cabaza Prieta/Pinacate biosphere area (southwest Arizona/Sonora), the Nogales, Arizona and Sonora area, and the southern California/Baja California area. Various ecoregion employees will participate as opportunities arise.

- The Joint United States-Mexico Joint Committee. Cooperative partnership funding with Mexico on fish and wildlife conservation surveys, studies, and conservation initiatives.

SERVING BECC AND ITS CLIENTS

Specific examples follow which demonstrate how the Service can serve resource managers, project planners, and decision makers in the planning, implementation, and evaluation processes.

- Planning strategies are needed to support NAFTA-induced border infrastructure development, water resource use and management, and public outreach along the United States-Mexico border. The Service has experience with facilitating water resource and environmental planning and coordination and public outreach with steering committees; planning teams; siting and basing teams, engineering, planning, and construction consultants; and multiple partnerships in natural resources conservation.

- The Service experience in coordinating with working entities and agencies on water resource planning is well founded and based upon the planning process used in water resource programs reviewed under the Fish and Wildlife Coordination Act, NEPA, and the Endangered Species Act. Such coordination is based upon early cooperation with project proponents and agencies and the public in water resource and natural resources conservation.

- Service cooperative initiatives with Mexico and United States agencies, State and local government agencies, nongovernmental organizations, and private landowners have led to several planning, infrastructure, and conservation projects along the United States-Mexico border that benefit people as well as border ecosystem health and fish and wildlife resource conservation. The Service can offer assistance in an evolving binational environmental planning, guidance, and public outreach process that may incorporate coordination, public involvement, tiered planning, and commitment to either nation's environmental laws and regulations.

- As a Federal land managing agency along the border, the Service mission involves providing solutions to water resource and land management issues as well as serving as a regulatory and planning agency. The Service can offer planning insights in a flexible process that looks at not only procedures for habitat evaluations and conservation strategies, but also multiple issue planning for proposed water and waste water projects. The Service has experience in developing a NEPA-like process for evaluating such projects and using effective public outreach and public involvement and developing an effective coordination process based upon experience with the Fish and Wildlife Coordination Act. The Service can offer its experience as a water and land resource manager.

- The Service NAFTA Team developed the concept of using a landscape planning/geographic information system (GIS) team to support United States-Mexico planning initiatives along the border. The cooperative agreement with the Earth Data Analysis Center (EDAC) makes this the first DOI GIS team available to serve the needs of the BECC in using GIS as an efficient planning tool. The DOI/EDAC team function will be based upon the need to manage a consistent landscape approach to border activities through GIS that benefits the public and Mexico (which is also being enlisted as a partner). The DOI/EDAC team can also provide bilingual training workshops in resource planning and GIS as a planning tool. The DOI/EDAC team is intended to complement existing GIS groups along the border, not duplicate them, and serve as a clearinghouse for GIS databases along the United States-Mexico border. It will offer its capabilities to the BECC as a follow-on to GIS border information (as that projected by the EPA in its 1993 report entitled, "Water-Related GISs Along the US/Mexico Border").

- The Service can assist in developing effective pollution prevention and control programs through its experience and leadership in the Natural Resources Damage Assessment (NRDA) Program and participation in the Joint United States-Mexico Contingency Plan for Accidental Releases of Hazardous Substances Along the Border. The primary issue of border pollutants, contaminant resources, and contingency planning and control is a key area in resource planning where the Service can assist the BECC and its clients.

SUMMARY OF EXPERTISE

Service field offices in all of the border States provide technical assistance and project review. The Service prefers to coordinate with project sponsors early in the planning process for maximum efficiency.

Service field station personnel at Ecological Services offices, National Wildlife Refuges, Fishery Resource offices, and Law Enforcement offices in the border regions will act as a team to address NAFTA-induced growth and development impacts on the natural resources of the border area. The Service will work as a partner with Mexico and, in the United States border States, with the DOI Field Coordinating Committee, BECC, private landowners, public land managers, local and State agencies, other Federal agencies, NGO's, and the public at large. These ecosystem teams will focus their energy on the priority issues in conserving border ecosystems.

The Service is responsible for a number of National Wildlife Refuges in the border region, including Tijuana Slough (CA), Cabeza Prieta (AZ), and Lower Rio Grande Valley (TX), and is active in the conservation of the region's significant fish and wildlife resources. The Service supports efforts to improve water quality and assure reliable flows to aquatic ecosystems because of the positive benefits to these resources that will result.

- NEPA Process - Assisting other agencies and groups as well as working on Service-sponsored NEPA documents in NEPA processes including public outreach, scoping, alternatives analysis, and mitigation planning.

- Water Resources Planning - Planning and evaluating several water resource development projects in the southwestern United States, assisting agencies and proponents develop mitigation features, and wetlands conservation initiatives with Mexico.

- Section 7 Consultations - Assisting Federal agencies in evaluating, analyzing, and planning proposed water resource projects to develop conservation measures for endangered species that can be accommodated in project construction, or management and operations.

EXAMPLES OF SERVICE PROJECTS

The International Wastewater Treatment Plant project for the Tifuana River in California and Baja California Norte is an example of a project that required extensive coordination with the Service. Considerable controversy was generated on this project because of serious concerns about impacts to endangered species (least Bell's vireo and others), and maintenance of flows in the river to sustain riparian and wetland habitats.

The Anzalduas International Crossings Project for the Lower Rio Grande Rio Bravo del Norte area of McAllen and Hidalgo, Texas, and Reynosa, Mexico, is an example of a project that required an environmental assessment, extensive coordination with the Service and successful negotiation and implementation of mitigation features for endangered species built into the project design during the coordination process.

Table 7.—Shared Watersheds of United States and Mexico

United States watersheds	Mexico watersheds
Texas	**Chihuahua, Coahuila, Nuevo Leon, Tamaulipas**
Rio Grande	Rio Bravo del Norte (Rio Grande)
Rio Grande Springs	Boquillas Springs
Pecos River	Rio Conchos/Rio Tarahumara
Devil's River	Rio San Carlos
Laguna Madre	Laguna Madre of Mexico
Gulf of Mexico	Gulf of Mexico
New Mexico	**Chihuahua**
Mimbres River	Guzman Basin
	Rio Piedras Verde
	Rio Piedras Negra
Rio Grande	Rio Bravo del Norte (Rio Grande)
Pecos River	Rio Conchos/Rio Tarahumara
Arizona	**Sonora**
Lower Colorado River	Lower Colorado River
Gila River	Sea of Cortez/Gulf of California
Sonoita River	Sonoita River
Sycamore Creek	Rio Concepcion and Tributaries
Santa Cruz River	Santa Cruz River and Tributaries
Sharp and Sheehy Springs	
Sonoita Creek	
San Pedro River	San Pedro River and Tributaries
Black Water Draw	Rio Yaqui and Tributaries
White Water Draw	
Rucker Canyon	
Leslie Creek	
California	**Baja California**
Pacific wetlands	Arroyo San Rafael
Tijuana River and Estuary	Tijuana River
New River and Salton Sea	New River

NATIONAL BIOLOGICAL SURVEY

NBS MISSION

The National Biological Survey (NBS) is the non-regulatory biological research arm of the Interior Department. NBS supports natural resource decision-making by providing leadership in gathering, analyzing, and disseminating biological information to support sound management practices. NBS was created in November 1993 by consolidating the biological research, inventory and monitoring, and information transfer programs of seven Interior bureaus: Fish and Wildlife Service, National Park Service, Minerals Management Service, and the Bureaus of Land Management, Reclamation, Mines, and Indian Affairs.

NBS BORDER PROJECTS

NBS manages macro and micro-scale projects and research conducted along the U.S.-Mexico border. NBS is developing several information management programs through the National Biological Information Infrastructure (NBII) which will collect data and information and make it accessible to natural resource decision-makers and communities across the country. NBS also has ongoing or planned regional ecological assessments that range from inventory and mapping of vegetation and terrestrial species along the border; to complete studies on the Sonoran desert and Lower Colorado River ecosystems; to contaminants research on Gulf Coast wetland ecosystems. Species-level projects focus on the effects of environmental contaminants including insecticides and PCBs on avian and aquatic species. The information transfer, inventory and monitoring, and biological research facilitated by NBS will provide decision-makers with the expertise and advice needed to support sound management of natural resources.

SERVING BECC AND ITS CLIENTS

Specific examples follow which demonstrate how NBS can serve resource managers in the planning, implementation and evaluation processes.

- Baseline data and accessible information are needed to develop a strategy and to support resource management and coordination on the border. The NBII can provide the information and expertise to strengthen border-wide planning and siting decisions. The GAP analysis program in the border states and the regional ecological assessments of land and water resources represent projects which will further the goal of accessible baseline data and information.

- To develop pollution prevention and clean-up programs, managers will need baseline information on levels and impacts of contamination. NBS, through its contaminants research on endangered and indicator species, can provide the information and expertise to resource managers to strengthen project development.

- To implement specific infrastructure projects, resource managers will need to evaluate the impacts of development and resource use on ecological resources. NBS has a range of habitat evaluation procedures that allow planners to analyze the impacts of development on local environments and plan mitigation strategies for displaced species.

- Allocation of water among competing uses requires an understanding of its impacts on natural resources. NBS can assist in this through its In-stream Flow Group which works to determine how much water is needed to serve multiple purposes such as municipal and agricultural needs, while maintaining supplies for plant and animal species.

- Finally, in the evaluation process of wastewater infrastructure projects, managers will need to determine progress toward water quality goals. NBS's contaminants program can identify and analyze chemical concentrations in aquatic species and ecosystems. NBS can also provide the information needed to design clean-up programs.

SUMMARY OF NBS EXPERTISE

- *Access to Expertise and Biological Data* in biological and ecological sciences through the NBS network of research centers, field stations, and cooperating universities; and partnerships with U.S. and Mexican institutions.

- *Biological Inventories* to map the biological resources at the species, population, and ecosystem level.

- *Research* to integrate biological factors in planning and evaluating border projects, emphasizing the effects of contaminants and land use changes on ecosystems and species, mitigating habitat loss and ecosystem restoration

- *Design Biological Monitoring Programs* to establish baseline conditions and evaluate project performance.

- *Develop Data and Information Systems* to provide biological information such as the GAP Analysis program will document the distribution and protection status of biodiversity in regional planning and assessment.

Good

- *Develop and Test Models* to predict uncertainties in the effects of project alternatives on species populations and biodiversity.

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NATIONAL PARK SERVICE

NPS MISSION - GENERAL

The primary responsibility within the National Park Service (NPS) must be the protection of parks' resources in the support of the 1916 legislation that created the National Park System and charged the agency "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The NPS mission applies to parks under their jurisdiction in the U.S./Mexico border. Also, the NPS mission applies to parks under their jurisdiction in the U.S./Mexico border. Also, the NPS, which manages 18 percent of the 2,000-mile border, is the largest stakeholder in DOI in terms of land area on the U.S. border with Mexico.

Our mission specific to NAFTA is to forge partnerships with United States and Mexico agencies, institutions, groups, and individuals to assist in preserving and protecting shared natural and cultural resources along the border.

The NPS manages five units directly on the border. Amistad National Recreation Area, Texas, shares 75 miles of common border; Organ Pipe Cactus National Monument, Arizona, shares 30 miles of common border; Coronado National Memorial, Arizona, shares 5 miles of common border; and Big Bend National Park and Rio Grande Wild and Scenic River, Texas, share 245 miles, or 13 percent, of the entire United States-Mexican border.

In response to a variety of common border interests of the Department of the Interior, the NPS has formed a Mexico Affairs branch office close to the border in Las Cruces, New Mexico. The establishment of this office enables free dialogue with Mexico, and sends a strong signal to the Mexican Government that the NPS wishes to engage in operational, as well as formal cooperation with Mexican counterparts.

This office conducts programs under a formal agreement with the government of Mexico. The NPS Mexican Affairs Program is assisting the U.S. Department of the Interior (DOI) and Mexico to focus on land management, natural resources, and cultural heritage preservation issues. With the establishment of this program, the Department has another mechanism within which NAFTA environmental issues can be informally discussed. Additionally, this office, coupled with the NPS-managed units on the border, works closely with other agencies within the DOI and other governmental agencies involved in cooperative endeavors with Mexico.

NPS BORDER PROJECTS

The NPS, U.S.-Mexico Affairs Program Staff conducts training and education programs for Mexican resource managers. Students and government officials from the U.S. and Mexico also have attended sessions concerning the management and planning of protected areas in the field and classrooms.

The program promotes binational projects in training, research, and environmental education. Presently, the office is involved in conservation projects with Mexican universities and State officials from Tamaulipas, Coahuila, Chihuahua, and Sonora. Through education and shared international experience, both nations strive to preserve natural and cultural resources for the benefit of present and future generations.

To solve environmental issues, the program will follow up on our successful efforts to establish extended Biosphere reserves and protected areas on both sides of the border between Organ Pipe

Cactus National Monument and Sonora and Big Bend National Park and Chihuahua and Coahuila. In 1993-94, the Mexican government declared reserves in over 3 million acres of land adjacent to Big Bend National Park in Texas and Organ Pipe Cactus national monument in southern Arizona.

The NPS is also involved with a Lower Rio Grande Corridor Heritage Project, "Los Caminos del Rio" and several "Historic Trail" projects that extend deep into the Mexican interior including El Camino Real de Tierra Adentro and Juan Bautista de Anza trails. These projects involve the bicultural and historical ties with Mexico. NGOs and State government programs are an important aspect in community outreach events that involve local citizenry.

ADVISORY CAPABILITY TO BECC AND ITS CLIENTS

NPS can offer guidance and help to coordinate community outreach programs on the border on the issues of water quality and use it affects our parks.

NPS can help to bring BECC interests into the U.S.-Mexico Border States Conference, which focuses on environmental issues. This conference will probably be conducted in Sonora, Mexico, in 1996. It will be held in Brownsville, Texas, May 5 this year. NPS has been the principal sponsor of this conference since 1985. Over 1,500 attendees from both countries have used this forum to discuss scientific issues and technological information exchange. Water issues are included in this forum.

NPS will continue to consult with the U.S. Fish and Wildlife Service, the Bureau of Land Management, and other DOI agencies that are involved with the DOI Field Coordinating Committee on Border Environmental Affairs.

NPS is contributing substantial expertise in Water Quality and Hydrology to the DOI "Shared Water Resources" issues working group headed by the U.S. Geological Survey. It is expected that this issue team will be one of the principal consultants to the BECC.

SUMMARY OF NPS EXPERTISE AND CONTACTS

The NPS Water Resources Division headquartered in Fort Collins, Colorado, has 30 individuals dedicated to Hydrology and water-related issues. This includes 12 positions in water operations, 3 positions involved in planning, and 15 persons addressing water rights issues. The water rights section interacts primarily on water rights adjudication issues on a case-by-case basis.

Big Bend National Park has a Chief Scientist who is involved in border water resources issues. The Southwest Regional Office in Santa Fe, New Mexico, employs a Chief Scientist who coordinates water-related issues in our border parks.

In addition to these water-related capabilities, the NPS also has:

- Southwest Regional Environmental Compliance Assets.
- Denver Service Center with Natural Resource Planners and Environmental Compliance Specialists who deal with planning, design, and construction of NPS physical facilities.
- Air Quality Division located in Denver, CO, which has 30 specialists dealing with air quality issues.

U.S. GEOLOGICAL SURVEY

MISSION

The U.S. Geological Survey (USGS), a bureau of the Department of the Interior and the Nation's largest earth-science research and information agency, was established to provide a permanent Federal agency to conduct systematic and scientific "classification of the public lands and examination of the geologic structure, mineral resources and products of the national domain." To meet this mission, the USGS provides geologic, topographic, and hydrologic information that contributes to the wise management of the Nation's natural resources and that promotes the health, safety, and well-being of the people. This information consists of maps, data bases, and descriptions and analyses of the water, energy, and mineral resources, land surface, underlying geologic structure, and dynamic processes of the earth.

EXAMPLES OF ACTIVITIES IN THE BORDER REGION

- The Lower Rio Grande Valley Project will develop a geospatial data base for underpinning water-related GIS transboundary studies. The project involves the Bureau of Reclamation, the Fish and Wildlife Service, the Soil Conservation Service, the United States section of the International Boundary and Water Commission, the Texas Water Development Board, and the Mexican National Institute of Statistics, Geography, and Information (INEGI). It will involve digital base mapping and water-resource assessment of the Lower Rio Grande Valley drainage basin, from the mouth of the river to the Amistad Reservoir.

- The El Paso/Cuidad Juarez border pilot project with INEGI is designed to address data interoperability and spatial data integration in producing pilot border digital cartographic data base. Upon completion, the pilot will provide mechanism for transborder digital base mapping and data base development.

- Two National Water Quality Assessment Program (NAWQA) study units are underway: The Rio Grande Study Unit ending at El Paso, and the Central Arizona Basins Study Unit which includes San Pedro and Santa Cruz basins on both sides of the border. The long-term goals of the NAWQA program are to describe the status and trends in the quality of large, representative parts of the Nation's surface-water and ground-water resources, and to provide a sound, scientific understanding of the primary natural and human factors affecting the quality of these resources. Both of the above study units will produce a wealth of water-quality information that will have tremendous benefit to the border area policy makers and managers such as BECC.

- Several geologic mapping projects are being carried out near the United States/Mexican border area. These projects will provide information useful for resource management decisions made by Federal agencies, including the Bureau of Land Management, the National Park Service, the Forest Service, and State and local organizations, as well as information useful to private industry and the general public. These include geologic mapping of: (1) Southern California, including the border region from San Diego almost to the Colorado River, (2) the Needles region, a unique desert area bisected by the Colorado River, (3) the Huachuca Mountains and the Chiricahua Mountains in southeastern Arizona, and (4) the Tularosa and Mogollon Mountains region of southwestern New Mexico.

- Hydrologic investigations and data collection efforts are taking place at a large variety of locations along the United States/Mexico border. These studies are designed to provide data and information which document the impact of land and water use on the hydrologic system. In addition, work is being done to characterize the relationship between land subsidence and ground-water withdrawals in the vicinity of El Paso/Juarez.

- A pilot study is newly initiated relating to cross-border contamination that will identify regions needing geochemical base-line studies, surficial geologic studies, and site-specific geologic, geochemical, and geophysical studies; develop efficient and practical methodologies of evaluation; and establish priorities for geoscientific studies.

- A new project has begun that would compile digital data on mineral and material supplies in the border region, including abandoned mine sites, mining contamination sites, and mining-related public hazards.

- Joint projects are underway with Mexico, including cooperative agreements for operating seismographic networks, to evaluate earthquake and volcano hazards and impacts on lifelines. An area of strong emphasis is the seismically active San Andreas fault which extends from southern California into Mexico with the potential of substantially impacting economic development and environmental conditions of the border region.

- The enhancement of USGS geoscience data bases that are repositories for geoscience data continues based on data collected during domestic and foreign studies, including geologic maps, water resources, aeromagnetic surveys, mineral resources, regional geochemical surveys, and coal resources. A goal is to standardize collection, analysis, storage, and availability of scientific data in the border region.

- Studies of coastal erosion of coastal barrier islands along the Gulf of Mexico coast and of pollution potential and marine processes along the corridor that includes San Diego and Tijuana are underway and/or in planning stages. USGS scientists participated in a United States/Mexico marine workshop (sponsored by the United States Embassy in Mexico City) to develop a collaborative United States/Mexico program in marine research within two shared oceans and to encourage development to support NAFTA through enhancement of technical infrastructure.

COORDINATION AND COOPERATION

- USGS information and expertise is available in support of land and resource management bureaus' objectives. NAFTA-specific Memorandums of Understanding (MOU's) could be developed that would ensure the best use of in-house expertise and resources to avoid duplication of efforts. These MOU's could be developed in the field and tracked and encouraged at headquarters.

- USGS has an international agreement with INEGI which broadens cooperative development and coordination of each Nation's digital mapping program along the border and an international agreement with Universidad Nacional Autonama (UNAM) for cooperation in the earth sciences. Examples of potential areas of cooperation with INEGI include:

  - Digital base mapping and joint development and maintenance of spatially referenced digital data base of the entire border that supports models linking key areas of environmental concern in North America such as population growth and distribution, energy demands, land degradation, and changes in land use, land cover, and climate.

  - Cooperative digital geographic-information studies and Geographic Information Systems (GIS) used for the integration, display, and analysis of remote sensing data for thematic mapping, change monitoring, assessment, math modeling, and forecasting and resource planning such as soil-related problems in agricultural crop production, mapping of forest and rangeland resources, identifying wildlife habitat along the border, and interpreting and compiling resource information and data base revision.

- Training and technology transfer programs are conducted in cooperation with several Mexican institutions, including Centro de Investigacion Cientifica y de Educacion Superior de Ensenada, Consejo de Recursos Minerales, National Autonomous University of Mexico, and INEGI.

The above description outlines briefly a few examples of projects and activities related to the border region. The USGS conducts geologic, water resources, and mapping research in the region and maintains a number of data bases of cartographic, geologic, and hydrologic data that can be used as sources of information by the Border Environmental Cooperation Commission (BECC), just as they are presently used by other Federal agencies, State and local organizations, and the academic community. The BECC is encouraged to contact the USGS during its efforts to evaluate and develop environmental projects in order to determine what information and expertise are available.

As the BECC considers environmental projects, it should consider collection or identifying regional or ecosystem environmental baseline data and information, such as the current ground- and surface water quality and quantity, human-induced and natural sources of pollution, and current land use and land cover information. Project planning should also address monitoring and assessing the environmental effect and effectiveness of the project in the long term. The USGS and other DOI bureaus are available to discuss these issues and concerns with the BECC staff.

USGS FIELD LOCATIONS INVOLVED IN BORDER REGION ACTIVITIES

- The USGS has a number of offices located near the border region.

  - Water Resources District Offices: Collects water quantity and quality data, conducts scientific investigations relating to water resources in cooperation with State and local agencies. District offices are located in Tucson, Arizona; Sacramento, California; Albuquerque, New Mexico; and Austin, Texas. A subdistrict office is located in San Diego, California; and a field office is located in Las Cruces, New Mexico.

  - Center for Inter-American Mineral Resource Investigations (CIMRI): Conducts and encourages studies of nonfuel mineral resources in the Americas and the Caribbean with four functions: mineral information exchange, training and technology transfer, cooperative investigations, and research.

  - Minerals Information Office (MIO): Outlet for mineral and environmental information on Latin America and American States that border Mexico. Averages 270-300 inquiries monthly from government agencies, public organizations, academia, and industry.

  - Western Mineral Resources Field Office (WMR): Conducts nonfuel mineral resource investigations in Arizona and part of New Mexico and provides outreach to disseminate earth science data.
  - Earth Science Information Center Office (ESIC): A joint effort of the Arizona Geological Survey and the USGS to provide and sell selected geoscience information including cartographic, topographic, hydrologic, geologic, and mineral resources data to the public.
- Center for Environmental Geochemistry and Geophysics (CEGG): Current focus is on inactive and abandoned mine lands and environmental issues. Conducts studies on natural and human-induced contamination that comes from geologic sources.

PROJECT CONSIDERATIONS

The consequence of site-specific impacts on the hydrologic environment are regional in nature and generally poorly understood. Documentation of impacts is thus difficult and expensive. It is essential that environmental infrastructure projects give proper consideration to the earth science variability and complexity in a regional sense. Utilization of geologists, hydrologists, etc., who are experienced in an area/region is a prerequisite to developing institutional perspectives on the reasonableness of a project, and based on the unique setting of each site, proposing a data collection analysis program to judge environmental suitability.

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Section IV

POLICY AND REGULATORY REFERENCES

This section provides a list of policy and regulatory references that are general guidelines for activities undertaken in the United States by Federal agencies. Some of the references could apply to BECC.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES

Title	Description
Air Quality	
Clean Air Act and Amendments of 1970 (42 U.S.C. 7401 et seq.) - National Primary and Secondary Ambient Air Quality Standards, 40 CFR 50; State Implementation Plan Requirements, 40 CFR 51.	Protects and enhances the quality of the Nation's air.
Cultural Resources	
Federal Laws	
Antiquities Act of 1906 (16 U.S.C. sec. 431, 34 Stat. 225).	Provides protection for archeological resources, authority to set aside National monuments, historic and prehistoric structures, and other objects of historic or scientific interest.
Historic Sites Act of 1935 (P.L. 74-292, 16 U.S.C. sec. 461-467).	Declares Federal policy to preserve historic and prehistoric properties of national significance. This was the original authorization for the national historic landmarks program. It gives the Secretary of Interior broad powers to protect nationally significant historic properties, including the Secretary's authority to establish and acquire nationally significant historic sites.
National Historic Preservation Act of 1966 (P.L. 89-665, 16 U.S.C. sec. 470-470t, 80 Stat. 915), as amended (P.L. 95-515).	Protects historic sites and values in cooperation with other nations, States, and local governments. Establishes the National Register of Historic Places (36 CFR Part 60) and the Advisory Council on Historic Preservation, and the Council's powers to review Federal undertakings. Establishes a partnership with State Historic Preservation Offices and Certified Local Governments. Creates the Historic Preservation Fund and National Trust for Historic Preservation. Requires Federal agencies to take into account the effects of their actions on historical and cultural sites that are included or eligible for inclusion in the National Register. Federal agencies are required under section 106 of the Act to consult with State Historic Preservation Officers on the effects of their actions on historical and cultural resources. Provides for a grant-in-aid program to the States.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Laws (cont.)	
Archaeological Recovery Act ("Moss-Bennett") (P.L. 86-523, 16 U.S.C. 469-469c).	Requires Federal agencies to provide notice to the Secretary of Interior of any dam constructions and, if archeological resources are found, for recovery or salvage of them. The law was amended in 1974 to apply to any agency whenever it received information that a direct or Federally assisted activity could cause irreparable harm to prehistorical, historical, or archaeological data; up to 1 percent of project funds could be used to pay for salvage work. (The NHPA authorized additional funding for this purpose.)
Archeological and Historic Preservation Act of 1974 (P.L. 93-291, U.S.C. sec. 469a-1).	Protects scientific, prehistoric, and archeologic data that would be affected by federally licensed or assisted activities.
American Indian Religious Freedom Act of 1978 (P.L. 95-341, 42 U.S.C. 1996).	Protects and preserves the right of American Indians, Eskimos, Aleuts, and Native Hawaiians to believe, express, and exercise their traditional religions.
Archaeological Resources Protection Act of 1979 (ARPA) (P.L. 96-95, 16 U.S.C. sec. 470aa et seq.).	Supplements the provisions of the 1906 Antiquities Act. Makes it illegal to excavate or remove from Federal or Indian lands any archeological resources without a permit from the land manager. P.L. 100-555 amends ARPA by requiring Federal agencies to develop plans for surveying lands not scheduled for projects and develop and implement a uniform system for reporting and recording archaeological violations. P.L. 100-588 amends the ARPA by lowering the felony threshold to $500; adding attempt to loot or vandalize as a crime; and requiring Federal land managers to develop public awareness programs.
Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601; 104 Stat. 3048, 25 U.S.C. 3001 note).	Requires Federal agencies and museums to inventory human remains and associated funerary objects and to provide culturally affiliated tribes with the inventory of collections; requires repatriation, on request, to the culturally affiliated tribes; establishes a grant program within the Department of the Interior to assist tribes and Native Hawaiian organizations in repatriation and to assist museums in preparing the inventories and collections summaries; makes the sale or purchase of Native American human remains, whether or not they derive from Federal or Indian lands, illegal.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Regulations	
Determinations of Eligibility for Inclusions in the Register of Historic Places (36 CFR Part 63).	
Curation of Federally Owned and Administered Archeological Collections (36 CFR Part 79).	
Protection of Historic Properties (36 CFR Part 800).	
Protection of Archeological Resources: Uniform Regulations (43 CFR Part 7).	
Executive Orders	
11593, 1971 (Protection and Enhancement of the Cultural Environment) (16 U.S.C 470).	Requires Federal agencies to avoid inadvertently destroying properties which appear to qualify for listing in the National Register.
Guidelines	
Preservation and Protection of Museum Property (411 DM).	
Protection of Properties on the National Register of Historic Places (426 DM 1).	
Preservation of Historic Property (519 DM 1).	
Policy	
Bureau of Reclamation Indian Trust Asset Policy of 1993.	Reclamation will carry out its activities in a manner which protects Indian Trust Assets (e.g., lands, minerals, hunting and fishing rights, water rights, and instream flows) and avoids adverse impacts when possible.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Minerals	
Federal Laws	
Mineral Leasing Act Amendments of 1973 (30 U.S.C. sec. 185)	
Federal Coal Leasing Amendments Act of 1976 (30 U.S.C. sec 201(a))	
Miscellaneous	
International Agreements	
La Paz Agreement of 1983.	Provides an important vehicle for coordinating the border activities of environmental agencies. Many of the provisions are not mandatory.
Federal Laws	
Demonstration Cities and Metropolitan Development Act of 1966 (42 U.S.C. sec. 3334).	
Intergovernmental Cooperation Act of 1968 (P.L. 90-577, 42 U.S.C. sec. 4201, 4231, 4233 (including urban impact analysis).	Encourages better cooperation and coordination of activities among levels of government in order to improve the operation of the Federal system.
Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) and Title IV - Uniform Relocation Act amendments of 1987 (42 U.S.C 4601).	Provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and Federally assisted programs and establishes uniform and equitable land acquisition policies for Federal and Federally listed programs.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Laws (cont.)	
Noise Control Act of 1972, as amended (42 U.S.C. sec. 4901 et seq.).	
Farmland Protection Policy Act of 1980 (P.L. 97-98).	Requires identification of proposed actions that would affect any lands classified as prime and unique farmlands.
Food Security Act (Farm Bill) of 1985.	Intended to reverse the declining economic environment on the American farm. Recognizes a need to more effectively manage the physical environment upon which American farmers depend. Includes "sodbuster" and "swampbuster" provisions.
Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. 136 et seq.).	
Executive Orders	
11644	Deals with off-road vehicles.
11989	Deals with off-road vehicles.
12114 (Environmental Effects Abroad of Major Federal Actions, 1979).	Addresses how environmental review processes should be implemented for major Federal actions having significant environmental effects outside the borders of the U.S.
12372	Deals with intergovernmental review of Federal programs.
12416	Deals with intergovernmental review of Federal programs.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Multi-resource	
Federal Laws	
National Environmental Policy Act of 1969 (NEPA), as amended; P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852, January 1, 1970, as amended by P.L. 94-52, July 3, 1975, and P.L. 94-83, August 9, 1975.	Directs that all agencies of the Federal Government shall insure that presently unquantified environmental amenities and values be given appropriate consideration. Declares the national policy to encourage a productive and enjoyable harmony between man and his environment. Requires all Federal agencies, with respect of major Federal actions significantly affecting the quality of the human environment, to prepare a detailed statement on the environmental impact of the proposed action, any adverse environmental effect which cannot be avoided should the proposal be implemented, alternatives to the proposed action, the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. Calls for the "integrated use" of social science in assessing impacts "on the human environment."
	Economic and Environmental Principles for Water and Related Land Resources Implementation Studies pursuant to Water Resources Planning Act of 1965 (P.L. 89-80) as amended (U.S.C. 1962a-2 and d-1).
Resource Conservation and Recovery Act of 1976 (RCRA) (P.L. 94-580, 42 U.S.C. sec. 3251 et seq.).	Promotion and protection of health and the environment and conservation of valuable material and energy resources. The first serious Federal attempt to address the problems of solid waste and hazardous waste management.
U.S. Council on Environmental Quality 1978:29 (40 CFR 1500-1508), (1978).	Regulations for implementing the procedural provision of the National Environmental Policy Act. The "human environment" is to be "interpreted comprehensively," to include "the natural and physical environment and the relationship of people with that environment."
Council on Environmental Quality (40 CFR 1500-1508), (1986) reissue of regulation implementing the procedural provision of the National Environmental Policy Act.	The human environment is defined, and the cost-benefit provision is eliminated.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund) (P.L. 96-510, 42 U.S.C. 9601 et seq.).	Deals with the cleanup of the worst abandoned hazardous waste sites in the country.
Superfund Amendments and Reauthorization Act of 1986	Extensively amends CERCLA; major goals include increased pace of cleanup.

Table 8.—**SUMMARY of POLICY and REGULATORY REFERENCES** (continued)

Title	Description
Federal Laws (cont.)	
Coastal Barriers Resources Act.	
Estuary Protection Act.	
Federal Power Act (16 U.S.C. sec. 797).	
Executive Orders	
11514 (amended by 11991; Protection and Enhancement of Environmental Quality, 1977).	Directs Federal agencies to initiate measures needed to direct their policies, plans, and programs so as to meet national environmental goals.
12088 (Federal Compliance with Pollution Control Standards, 1978).	The head of each executive agency is delegated responsibility for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution.
12915 (Federal Implementation of the North American Agreement on Environmental Cooperation).	States that the "Environmental Cooperation Agreement" shall be implemented consistent with United States policy for the protection of human, animal, or plant life or health, and the environment. The Agreement shall also be implemented to advance sustainable development, pollution prevention, environmental justice, ecosystem protection, and biodiversity preservation. The E.O. goes on to say that policy priorities include pollution prevention techniques and strategies, transboundary and border environmental issues, the conservation and protection of wild flora and fauna (including endangered species), their habitats and specially protected natural areas, and environmental emergency preparedness and response activities.
12916 (Implementation of the Border Environment Cooperation Commission and the North American Development Bank).	States that the North American Agreement on Environmental Cooperation shall be implemented consistent with the U.S. policy for the protection of human, animal, or plant life or health, and the environment. The Agreement shall also advance sustainable development, pollution prevention, environmental justice, ecosystem protection, and biodiversity preservation. The policies and positions of the U.S. in the BECC shall be coordinated through applicable interagency procedures, which shall include participation by "...the Department of the Interior..."

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
State Laws	
California Environmental Quality Act (CEQA).	Provided for exemptions of some certified regulatory programs from the requirements of CEQA.
Public Lands, Open Space, Recreation	
Refuge Recreation Act of 1962 (16 U.S.C. 460K - 460k-4, 76 Stat. 653).	Authorizes appropriate, incidental, or secondary recreational use on conservation areas administered by the Secretary of the Interior for fish and wildlife purposes.
Wilderness Act of 1964 (16 U.S.C. sec. 1131-1136, 78 Stat. 890).	Establishes the wilderness system as a supplement to the purposes for which units of the National Wildlife Refuge System are established.
Federal Surplus Lands for Parks and Recreation Act of 1970 (P.L. 91-485).	
Federal Land Policy and Management Act (43 U.S.C. sec. 1701, 1761-1771).	
Forest and Rangeland Renewable Resources Act (16 U.S.C. sec. 1601 et seq.).	
Open Space Lands (42 U.S.C. sec. 1500a(d)).	
Recreation Demonstration Projects Act (56 Stat. 326).	
Urban Park and Recreation Recovery Act (16 U.S.C. sec. 2501 et seq.).	

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Water and Related Land Resources	
International Laws	
Convention with Mexico for the Upper Rio Grande, 1906.	
International Water Treaty of 1944.	Allocated 1.5 million acre-feet of Colorado River water to Mexico.
Federal Laws	
Constitution of the United States.	Places full power to control the disposition and use of water appurtenant to lands owned by the U.S. in Congress; however, the States have the power, at a minimum, to promulgate and exercise non-conflicting regulation.
Rivers and Harbors Act of 1899 (sec. 9 and 10) (33 U.S.C 401-413; Sec 407, referred to as the Refuse Act).	Section 10 prohibits the unauthorized obstruction or alteration of any navigable waters of the U.S.
National Reclamation Act of 1902.	Supported construction and maintenance of irrigation projects.
Rio Grande Reclamation Project, 1905.	Reclamation development in Texas and New Mexico authorized from proposed Engle Dam on the Rio Grande.
Land and Water Conservation Fund Act of 1965 (sec 6(f)) (16 U.S.C. sec. 4601-8(f) et seq.).	Provided for Congress to appropriate funds (on a matching basis) for planning, acquiring land and water areas for outdoor recreational use, and construction of outdoor recreation facilities.
Federal Water Project Recreation Act of 1965 (sec. 6(a)) (P.L. 89-72, 16 U.S.C. sec. 4601-21).	Federal agencies in planning navigation, flood control, reclamation, hydroelectric, or multipurpose water resource projects, must consider the potential outdoor recreational opportunities and potential fish and wildlife enhancement that the project might afford.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Laws (cont.)	
Water Resources Planning Act of 1965 (42 U.S.C. sec. 1962 et seq.).	
Wild and Scenic Rivers Act of 1968 (sec. 7) (P.L. 90-542, 16 U.S.C. sec. 1274 et seq.).	Provides for preservation of certain selected rivers in a free flowing condition and protection of their immediate environments.
Estuary Protection Act of 1970 (16 U.S.C. 1221-1226).	Provides a means to protect, conserve, and restore estuaries in a manner that maintains adequately and seasonably a balance between the national need for such protection in the interest of conserving the natural resources and natural beauty of the Nation and the need to plan for proposed development in these estuaries as growth occurs. Requires Secretary of the Interior to encourage States and local government subdivisions to consider the needs and opportunities for protecting and restoring estuaries.
Federal Water Pollution Control Act of 1972 (Clean Water Act, Public Law 92-500).	Required all navigable surface waters to be fishable and swimmable, and combined water quality standards with technology to control pollution.
Flood Disaster Protection Act of 1973 (12 U.S.C. sec 24, 1701-1 Supp, 42 U.S.C. 4001 et seq.).	
Safe Drinking Water Act of 1974 (P.L. 93-523, 42 U.S.C. sec. 300f et seq.) as amended by the Safe Drinking Water Act Amendments of 1986.	Provides for the safety of drinking water supplies throughout the U.S. by establishing National standards which the States are responsible for enforcing.
Reclamation Policy of 1977.	Supported reclamation of wastewaters when projects were consistent with sound principles and demonstrated needs.
"SWAMPBUSTER" Provisions of the Food Security Act of 1985 (16 U.S.C. 1221) (P.O. 99-198).	Provides that anyone who, after December 23, 1985, produced an agricultural commodity on a converted wetland would be determined ineligible for certain benefits provided by the U.S. Department of Agriculture and its agencies.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Laws (cont.)	
Watershed Protection and Flood Prevention Act of 1985 (16 U.S.C. 1001 - 1009).	Authorizes the FWS to make surveys and investigations and prepare a report for the conservation of wildlife resources of Soil Conservation Service small watershed projects. The Secretary of Agriculture is required to obtain the views and recommendations of the FWS prior to authorizing a project.
Land and Water Conservation Fund Act (LWCFA) of 1965.	Provides financial assistance to the States for outdoor recreation, primarily in planning; acquisition of land, water, or interests in land or waters; or development. In addition to assistance to the States, the LWCFA also provides that not less than 40 percent of the annual appropriation shall be available for Federal purposes. Funds appropriated for Federal purposes shall be made available for the acquisition of land, waters, or interests in land or waters for the National Park System, National Forest System, National Wildlife Refuge System, and Bureau of Land Management. The appropriations provided by the LWCFA are derived from Outer Continental Shelf leases, a tax on motorboat fuels, and the sale of certain surplus Federal lands. The FWS utilizes four basic acquisition authorities which are allowed through the funding authority of the LWCFA to purchase land and water: (1) Endangered Species Act of 1973; (2) Recreation Act of 1962; (3) Fish and Wildlife Act of 1956, except for migratory waterfowl areas; and (4) any areas authorized as additions to the National Wildlife Refuge System by specific Congressional Acts.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Laws (cont.)	
Emergency Wetlands Resources Act of 1986 (P.L. 99-645).	Mandates FWS to develop the National Wetlands Priority Conservation Plan in recognition of the need to protect, enhance, and restore our wetland heritage. The National Plan provides the framework, criteria, and guidance for identifying wetlands warranting priority attention for Federal and State acquisition using Land and Water Conservation Fund appropriations. The Plan's primary purpose is to help decisionmakers (at all levels of government) focus their acquisition and conservation efforts on the more important, scarce, and vulnerable wetlands in the Nation. It can also be used to identify wetlands warranting protection through measures that may not require land acquisition. The Wetlands Act contains a broad variety of measures available to the Department of the Interior and the FWS to promote wetland conservation, and to offset or prevent wetland losses. These include new options for generating revenues for acquisition and protection of wetlands, establishing the National Plan for wetland acquisition, requiring that State Comprehensive Outdoor Recreation Plans specifically address wetlands, completing mapping the nation's wetlands, and studying the effects of Federal programs on wetlands.
Food Security Act (Farm Bill) of 1990 (as amended) (P.O. 101-624).	Made several changes to the Swampbuster provision of the Food Security Act of 1985, including placing more emphasis on violations and graduated penalties for draining and converting wetlands; defining wetlands to include hydric soils, hydrology, and hydrophytic vegetation; requiring wetland determinations in connection with denial of benefits; expanding minimal effect and mitigation provisions, including minimal effect determinations to be made jointly by the FWS and the Soil Conservation Service; and expanding the agricultural benefits which can be lost for Swampbuster violations.
Clean Water Act (33 U.S.C. sec. 1251 et seq.).	Strives to restore and maintain the chemical, physical, and biological integrity of the Nation's water.
Watershed Protection and Flood Prevention Act.	

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Executive Orders	
11988 (Floodplain Management, 1977).	Requires a construction agency to avoid, where practicable alternatives exist, the short- and long-term adverse impacts associated with the occupancy and modification of floodplains. Requires Federal agencies to recognize the significant values of floodplains and to consider the public benefits that would be realized from restoring and preserving floodplains (including their wetland resources). The Floodplain Management Guidelines for Implementing E.O. 11988 were published in the Federal Register on February 10, 1978.
11990 (Protection of Wetlands, 1977).	Requires Federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.
Policy	
Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies.	
Wildlife	
Federal Laws	
Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711; 40 Stat. 755).	Implements treaties with Great Britain (for Canada), Mexico, Japan, and the Soviet Union for protection of migratory birds whose welfare is a Federal responsibility. Provides for regulations to control taking, possessing, selling, transporting, and importing of migratory birds, and provides penalties for violations.
Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715R, 45 Stat. 1222).	Authorizes acquisition, development, and maintenance of migratory bird refuges; cooperation with other agencies in conservation; and investigations and publications on North American birds.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Laws (cont.)	
Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d).	No person within the U.S. or any place subject to the jurisdiction thereof, shall possess, sell, purchase, barter, offer to sell, transport, export or import at any time or in any manner any bald eagle or any golden eagle, alive or dead, or any part, nest, or egg thereof.
Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, 70 Stat. 1119).	Establishes a comprehensive fish and wildlife policy and directs the Secretary of the Interior to provide continuing research and extension and information service, and directed development, management, and conservation of fish and wildlife resources.
Fish and Wildlife Coordination Act of 1970 (16 U.S.C. sec. 661 - 667e).	Provides that wildlife conservation will receive equal consideration and be coordinated with other features of water-resource development programs. Requires that a Federal agency consult with the FWS and State fish and wildlife agencies concerning the effects on fish and wildlife resources of a proposed Federal or non-Federal water resource development project requiring a Federal action (e.g., Federal sponsor, Federal permit, or Federal funding).
National Wildlife Refuge System Administration Act of 1966.	
Marine Protection, Research and Sanctuaries Act of 1972 (sec. 102, 103, 301) (16 U.S.C. sec. 1431 et seq.).	
Coastal Zone Management Act of 1972 (P.L. 92-583, 16 U.S.C. sec. 3501 et seq.).	Preserves, protects, develops, and where possible, restores or enhances the resources of the Nation's coastal zone.
Bald Eagle Protection Act of 1973 (U.S.C. 668).	
Endangered Species Act of 1973 (P.L. 93-205, 16 U.S.C. 1531 et seq., 87 Stat. 884).	Protects animal and plant species currently in danger of extinction and those that may become so in the foreseeable future. Authorizes the listing and determination of critical habitat of endangered and threatened species and requires consultation with the FWS on any Federally funded or licensed project that could affect any of these species or their habitat. Prohibits unauthorized taking, possession, sale, transport, etc., of endangered species. Authorizes an expanded program of habitat acquisition. Authorizes the establishment of cooperative agreements and grants-in-aid to States.

Table 8.—SUMMARY of POLICY and REGULATORY REFERENCES (continued)

Title	Description
Federal Laws (cont.)	
Anadromous Fish Conservation Act (16 U.S.C. 757).	
Fish and Wildlife Conservation at Small Watershed Projects (16 U.S.C. sec 1001, 1005(4), 1008).	
Marine Mammal Protection Act (16 U.S.C. sec. 1361 et seq.).	
Migratory Bird Conservation Act.	
Migratory Bird Treaty Act (16 U.S.C. 703 et seq.).	